Using the TotalView Debugger and MemoryScape

Aug 21, 2013

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Agenda

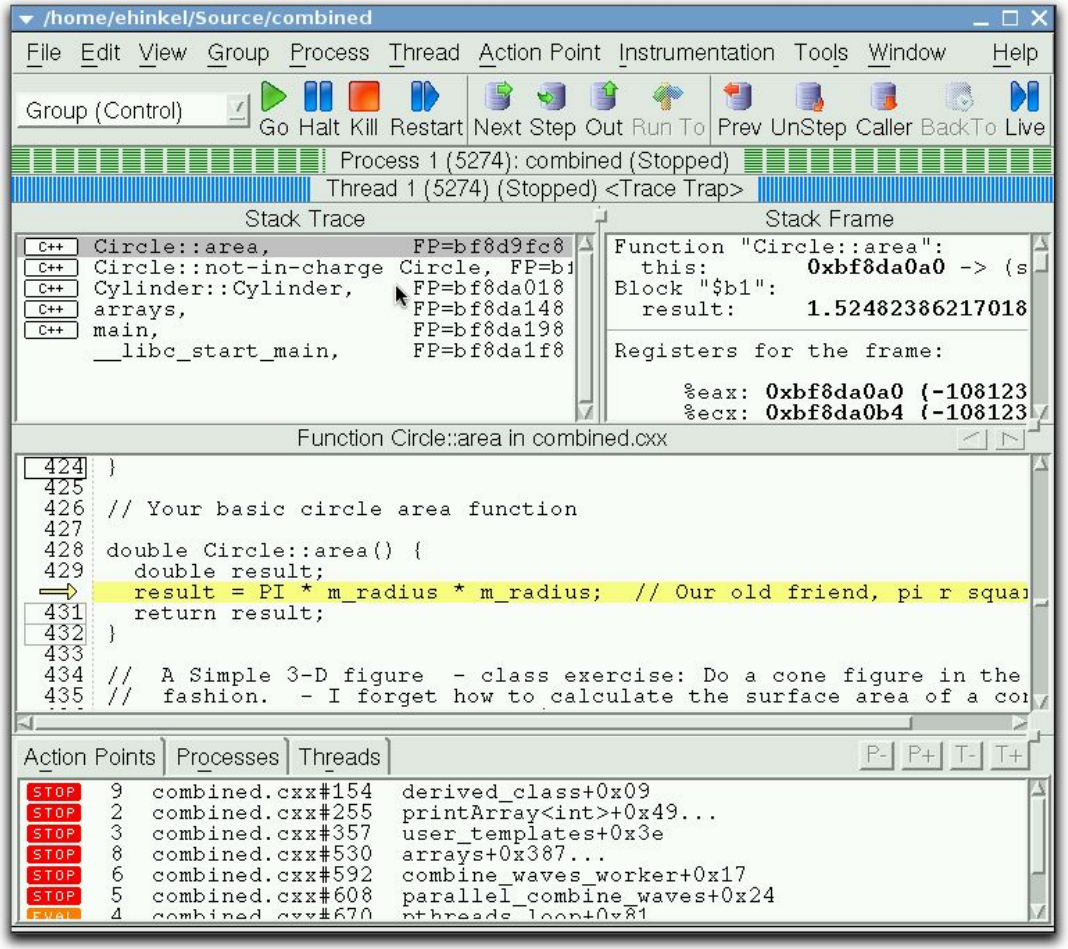
- TotalView Overview
- Starting up TotalView on Pleiades
- Accessing TotalView Remotely
- MemoryScape Leak Detection Example on Pleiades
- Q&A

Question? Use the Webex chat facility to ask the Host

What is TotalView?

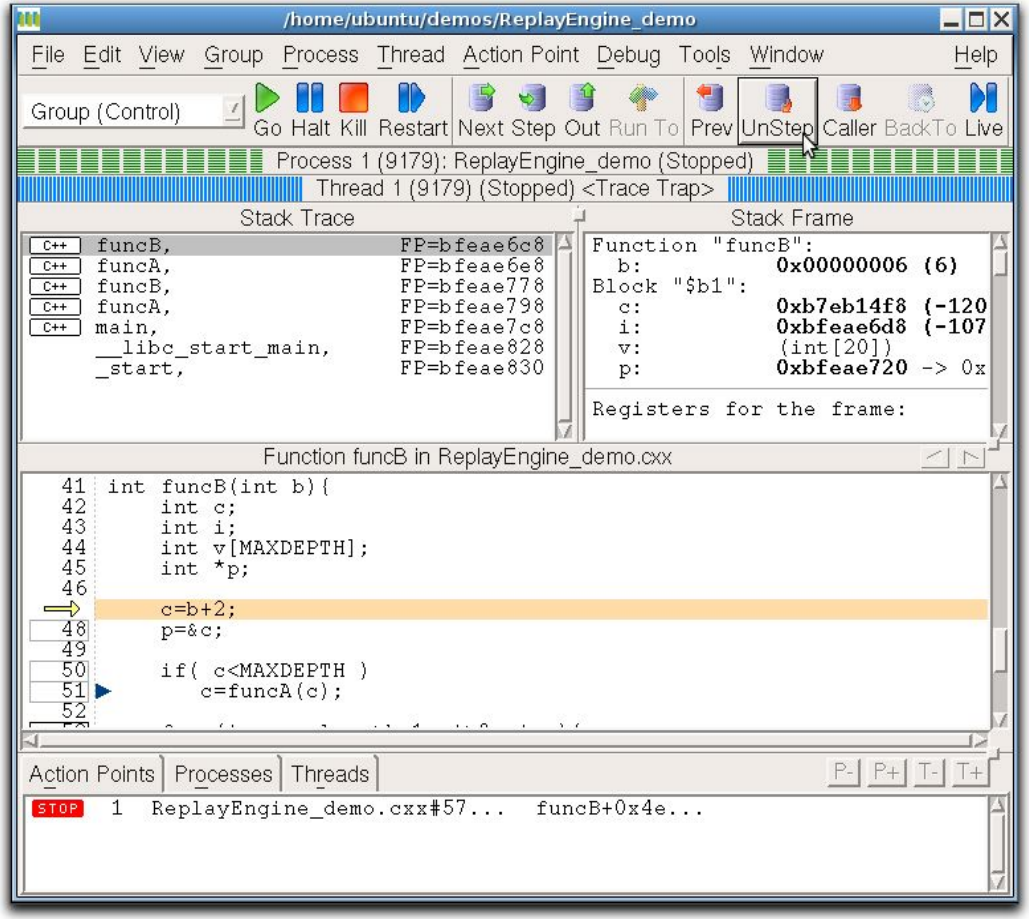
A comprehensive debugging solution for demanding parallel and multi-core applications

- Wide compiler & platform support
  - C, C++, Fortran 77 & 90, UPC
  - Unix, Linux, OS X
  - CUDA GPU, Intel MIC
- Handles Concurrency
  - Multi-threaded Debugging
  - Parallel Debugging
    - MPI, PVM, OpenMP
  - Remote and Client/Server Debugging
- Integrated Memory Debugging
- Reverse Debugging
- Supports a Variety of Usage Models
  - Powerful and Easy GUI / Visualization
  - CLI for Scripting
  - Long Distance Remote Debugging
  - Unattended Batch Debugging



Question? Use the Webex chat facility to ask the Host

Reverse Debugging - ReplayEngine



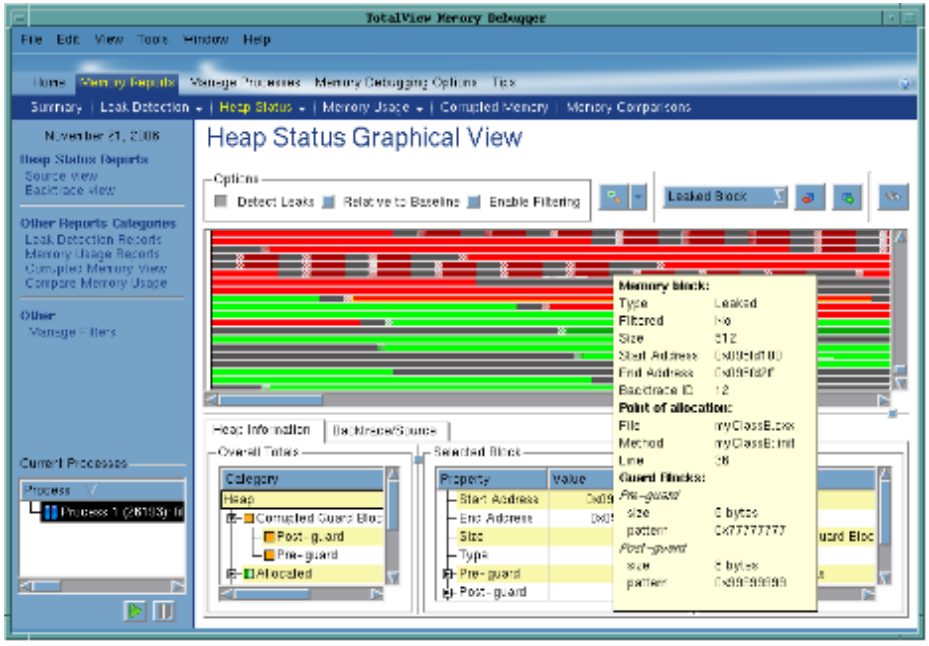
- **Captures execution history**
  - Records all external input to program
  - Records internal sources of non-determinism
  - Turn it on at any point
- **Replays execution history**
  - Examine any part of the execution history
  - Step back as easily as forward
  - Jump to points of interest

Question? Use the Webex chat facility to ask the Host

MemoryScape Overview

- Runtime Memory Analysis : Eliminate Memory Errors
  - Detects memory leaks *before* they are a problem
  - Explore heap memory usage with powerful analytical tools
  - Use for validation as part of a quality software development process

- Major Features
  - Included in TotalView, or Standalone
  - Detects
    - Malloc API misuse
    - Memory leaks
    - Buffer overflows
  - Supports
    - C, C++, Fortran
    - Linux, Unix, and Mac OS X
    - MPI, pthreads, OMP, and remote apps
  - Low runtime overhead
  - Easy to use
    - Works with vendor libraries
    - No recompilation or instrumentation



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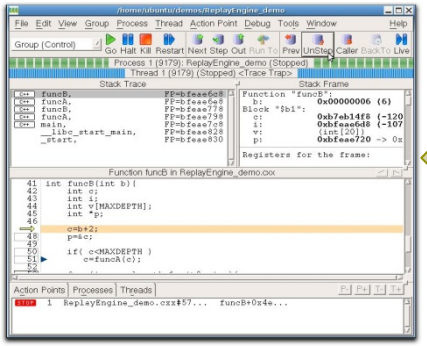
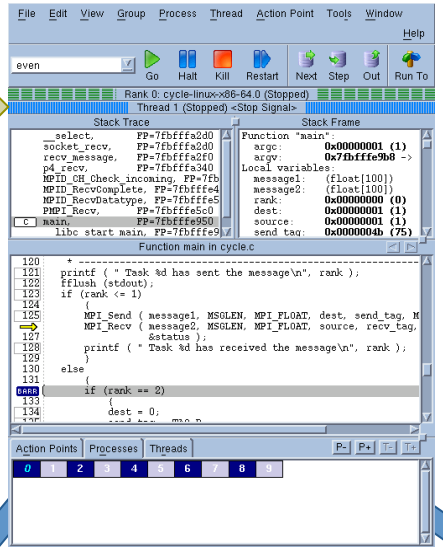
TotalView Debugging Ecosystem

Reverse Debugging with ReplayEngine



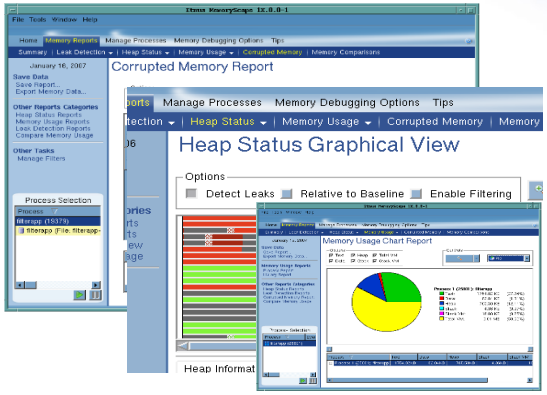
- Captures execution history
- Replays execution history
- Enable ‘on Demand’
- Step backwards!

Debugging with TotalView



- Parallel debugging
- Accelerator and coprocessor debugging
- Wide compiler and platform coverage
- Work Graphically
- Troubleshoot even your hardest bugs
- Develop Code Confidently!

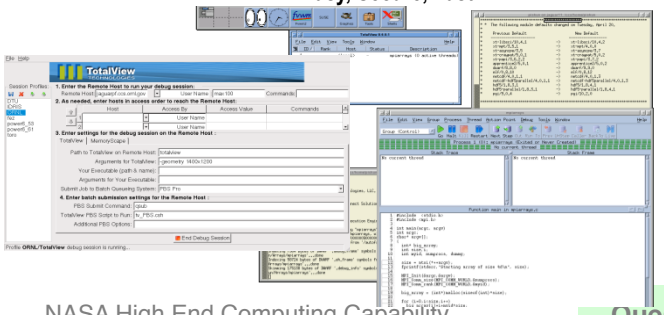
Memory Debugging with MemoryScape



- Graphical View of Heap Memory
- Low Overhead
- Detect:
  - Leaks
  - Buffer over/underflow
- MPI memory debugging

Remote Display Window

Easy, Secure, Fast



Batch Debugging with TVScript

- Unattended TotalView debugging

The Debugger of Choice for HPC and Enterprises

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More Information

TotalView demonstration videos available on the Rogue Wave TotalView Products page

http://www.roguewave.com/products/totalview/resources/videos.aspx

Starting TotalView on Pleiades (1/1)

- Load Modules
  - TotalView
    - module load *totalview/8.12.0-0*
  - MPI
    - module load *mpi-sgi/mpt.2.06r6*
      - Latest version of SGI MPT library *mpi-sgi/mpt.2.08r7* contains malloc_intercept which blocks TotalView Memory debugging
      - Module *mpi-sgi/mpt.2.06r6* was tested and allows TotalView MemoryScape to properly track heap allocations

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Starting TotalView on Pleiades (2/2)

- Set TotalView Environment Variable $TVLIB
  - TotalView
    - setenv TVLIB /nasa/totalview/toolworks/totalview.8.12.0-0/linux-x86-64/lib
  - Compile MPI programs with TV HIA library
    - mpicc -g -o *yourProgram yourprogram.ext* -L$TVLIB -ltvheap_64 -Wl,-rpath,$TVLIB
      - Required for MPI programs
      - HIA can be dynamically loaded in single process applications
  - Execute MPI program in TotalView
    - mpiexec_mpt –tv –n8 ./*yourProgram*
      - Do not select "Enable Memory debugging"
      - Executable is linked to the HIA library tvheap

Question? Use the Webex chat facility to ask the Host

Accessing Pleiades Remotely

- TightVNC
  - Follow the same Starting TotalView instructions on slides 8 and 9
- TotalView Remote Display Client (RDC)
  - RDC can be downloaded from Rogue Wave Website at *http://www.roguewave.com/products/totalview/remote-display-client.aspx*

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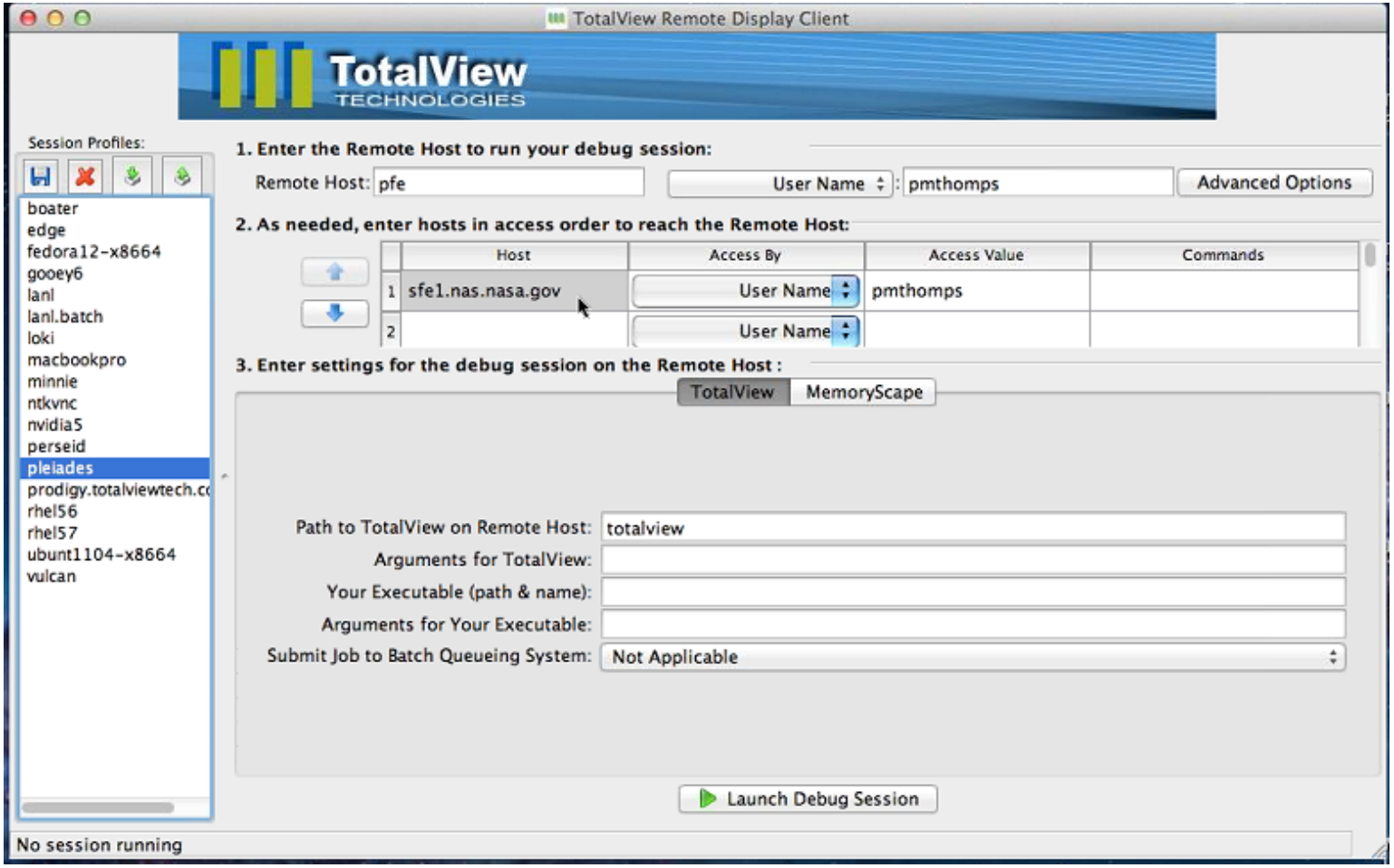
TotalView Remote Display Client (RDC)



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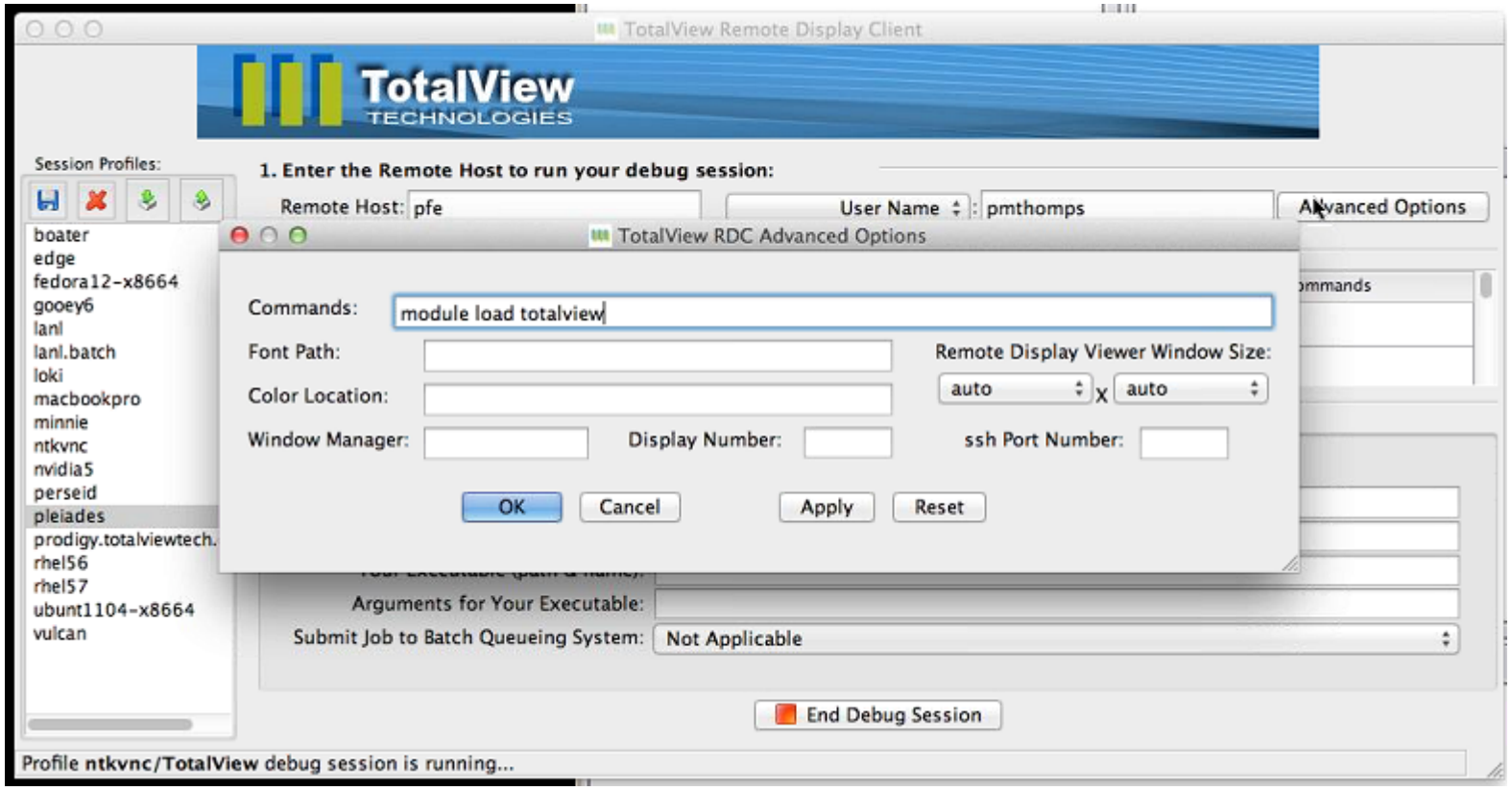
Pre-load TotalView Module on RDC



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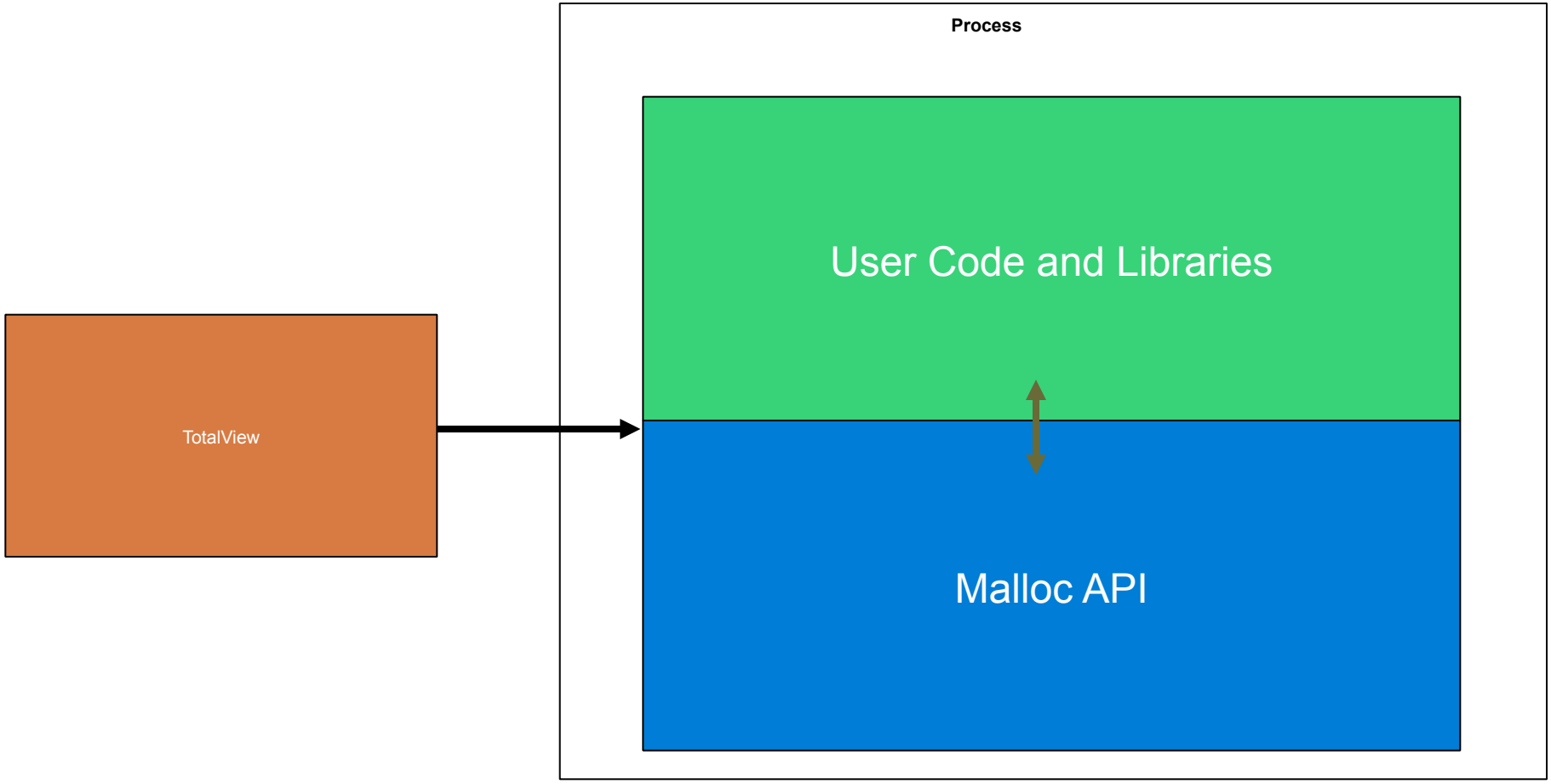
Memory Debugging

Question? Use the Webex chat facility to ask the Host

What is a Memory Bug?

- A Memory Bug is a mistake in the management of heap memory
  - Failure to check for error conditions
  - Leaking: Failure to free memory
  - Dangling references: Failure to clear pointers
  - Memory Corruption
    - Writing to memory not allocated
    - Over running array bounds

The Agent and Interposition



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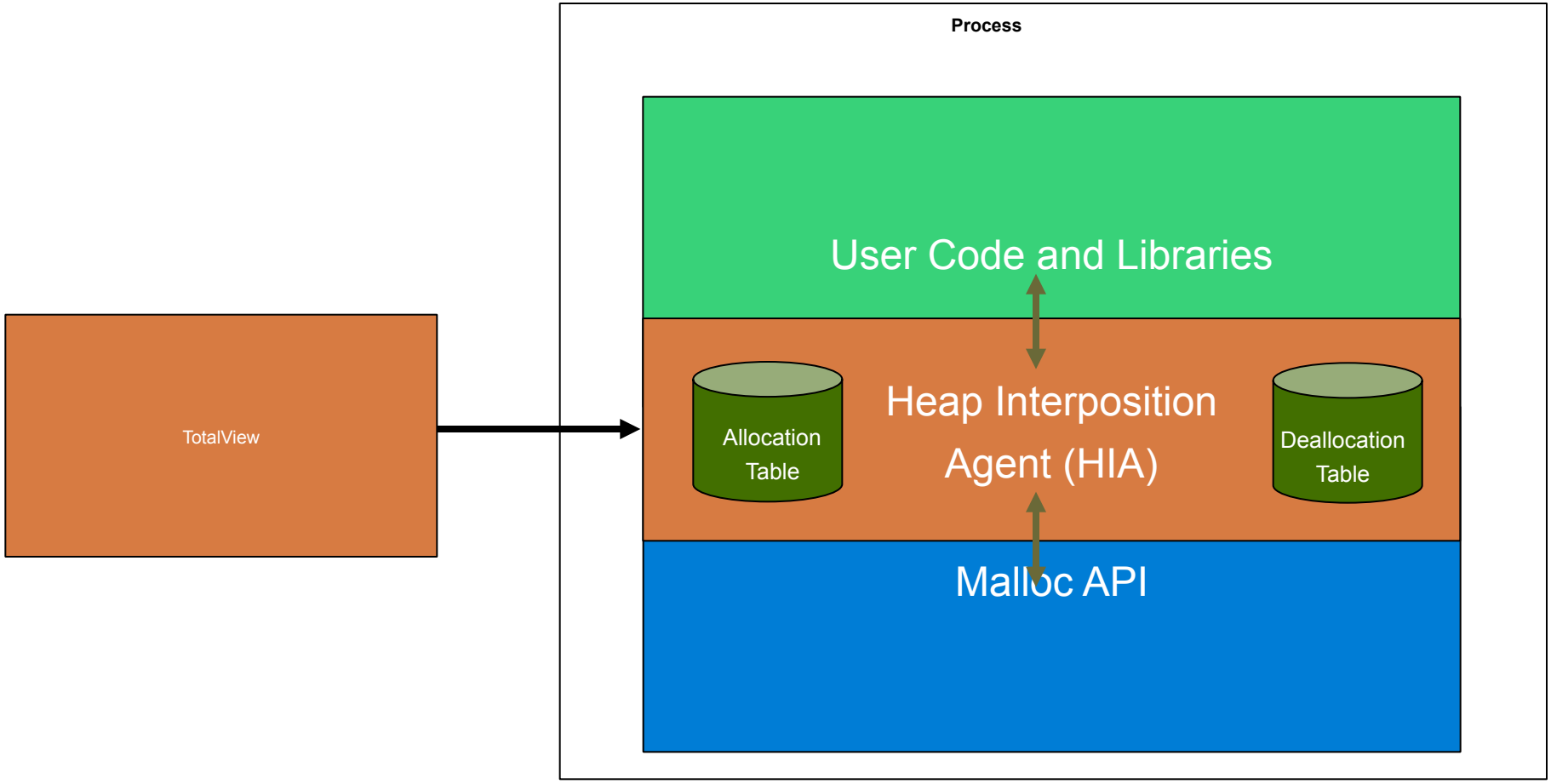

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TotalView HIA Technology

Advantages of TotalView HIA Technology

- Use it with your existing builds
  - No Source Code or Binary Instrumentation
- Programs run nearly full speed
  - Low performance overhead
- Low memory overhead
  - Efficient memory usage
- Support wide range of platforms and compilers

Memory Debugger Features

- Automatic detection of allocation problems
- Graphical heap view
- Leak detection
- Block painting
- Memory Hoarding
- Dangling pointer detection
- Deallocation/reallocation notification
- Memory Corruption Detection - Guard Blocks
- Memory Comparisons between processes
- Collaboration features

MemoryScape Leak Detection Example

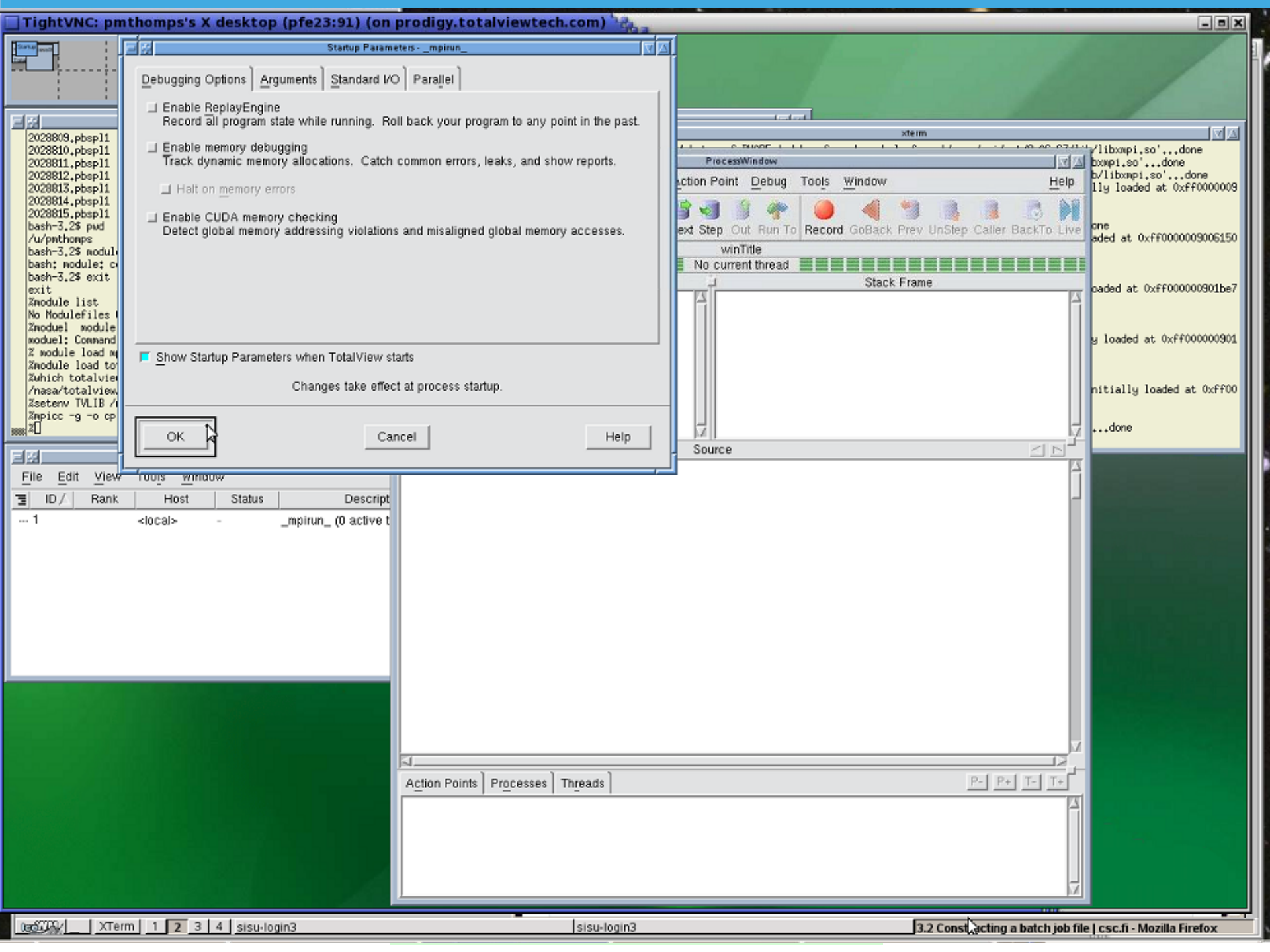
```
else
{
    h   = 1.0 / (double) n;
    sum = 0.0;
                x = f(h);
    for (i = myid + 1; i <= n; i += numprocs)
    {
      /* comments to increase line number of malloc */
      /*
       *
       *
       */

        x = h * ((double)i - 0.5);
        sum += f(x);
        freeptr = (char *) malloc ((unsigned long)150 *sizeof(char));
        strcpy(freeptr, "Testin");

    }
    mypi = h * sum;

    MPI_Reduce(&mypi, &pi, 1, MPI_DOUBLE, MPI_SUM, 0, MPI_COMM_WORLD);
```


Question? Use the Webex chat facility to ask the Host


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
Startup Parameters - _mpirun_
Debugging Options
Arguments
Standard I/O
Parallel
Enable ReplayEngine
Record all program state while running. Roll back your program to any point in the past.
Enable memory debugging
Track dynamic memory allocations. Catch common errors, leaks, and show reports.
Halt on memory errors
Enable CUDA memory checking
Detect global memory addressing violations and misaligned global memory accesses.
Show Startup Parameters when TotalView starts
Changes take effect at process startup.
OK
Cancel
Help
ProcessWindow
Action Point
Debug
Tools
Window
Help
Step
Out
Run To
Record
GoBack
Prev
UnStep
Caller
BackTo
Live
winTitle
No current thread
Stack Frame
Source
Action Points
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XTerm
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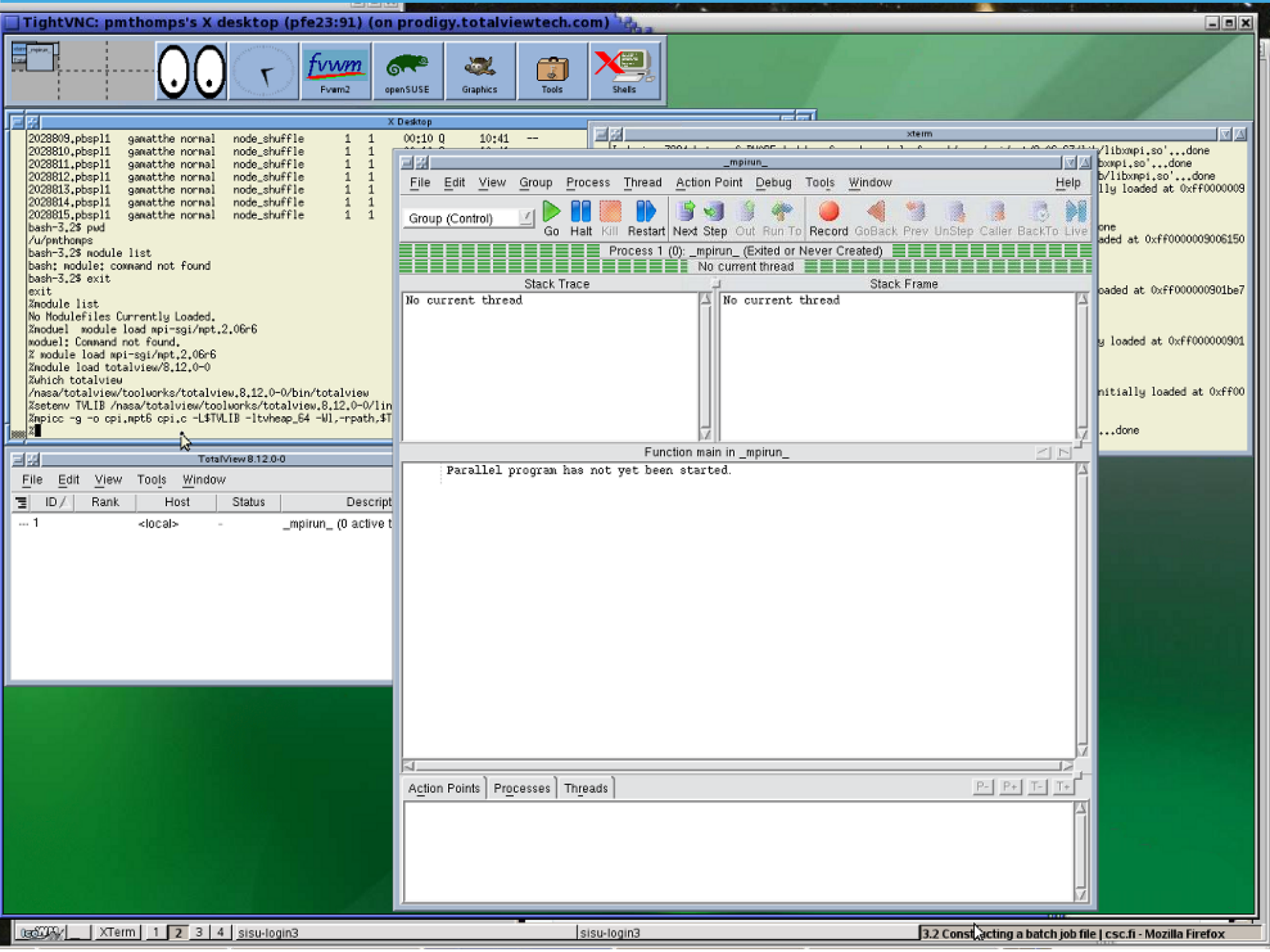
3.2 Constructing a batch job file | csc.fi - Mozilla Firefox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fvwm
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Shells
X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
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2028815.pbspl1 gamatthe normal node_shuffle 1 1
bash-3.2$ pwd
/u/pmthomps
bash-3.2$ module list
bash: module: command not found
bash-3.2$ exit
exit
%module list
No Modulefiles Currently Loaded.
%moduel module load mpi-sgi/mpt.2.06r6
moduel: Command not found.
% module load mpi-sgi/mpt.2.06r6
%module load totalview/8.12.0-0
%which totalview
/nasa/totalview/toolworks/totalview.8.12.0-0/bin/totalview
%setenv TVLIB /nasa/totalview/toolworks/totalview.8.12.0-0/lin
%mpicc -g -o cpi.mpt6 cpi.c -L$TVLIB -ltvheap_64 -Wl,-rpath,$T
%
xterm
/libxmpi.so'...done
bxmpi.so'...done
b/libxmpi.so'...done
lly loaded at 0xff0000009
one
aded at 0xff000000906150
oaded at 0xff000000901be7
y loaded at 0xff000000901
nitially loaded at 0xff00
...done
mpirun
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
Go Halt Kill Restart Next Step Out Run To Record GoBack Prev UnStep Caller BackTo Live
Process 1 (0): _mpirun_ (Exited or Never Created)
No current thread
Stack Trace
No current thread
Stack Frame
No current thread
Function main in _mpirun_
Parallel program has not yet been started.
Action Points Processes Threads
P- P+ T- T+
TotalView 8.12.0-0
File Edit View Tools Window
ID / Rank Host Status Descript
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XTerm 1 2 3 4 sisu-login3 sisu-login3
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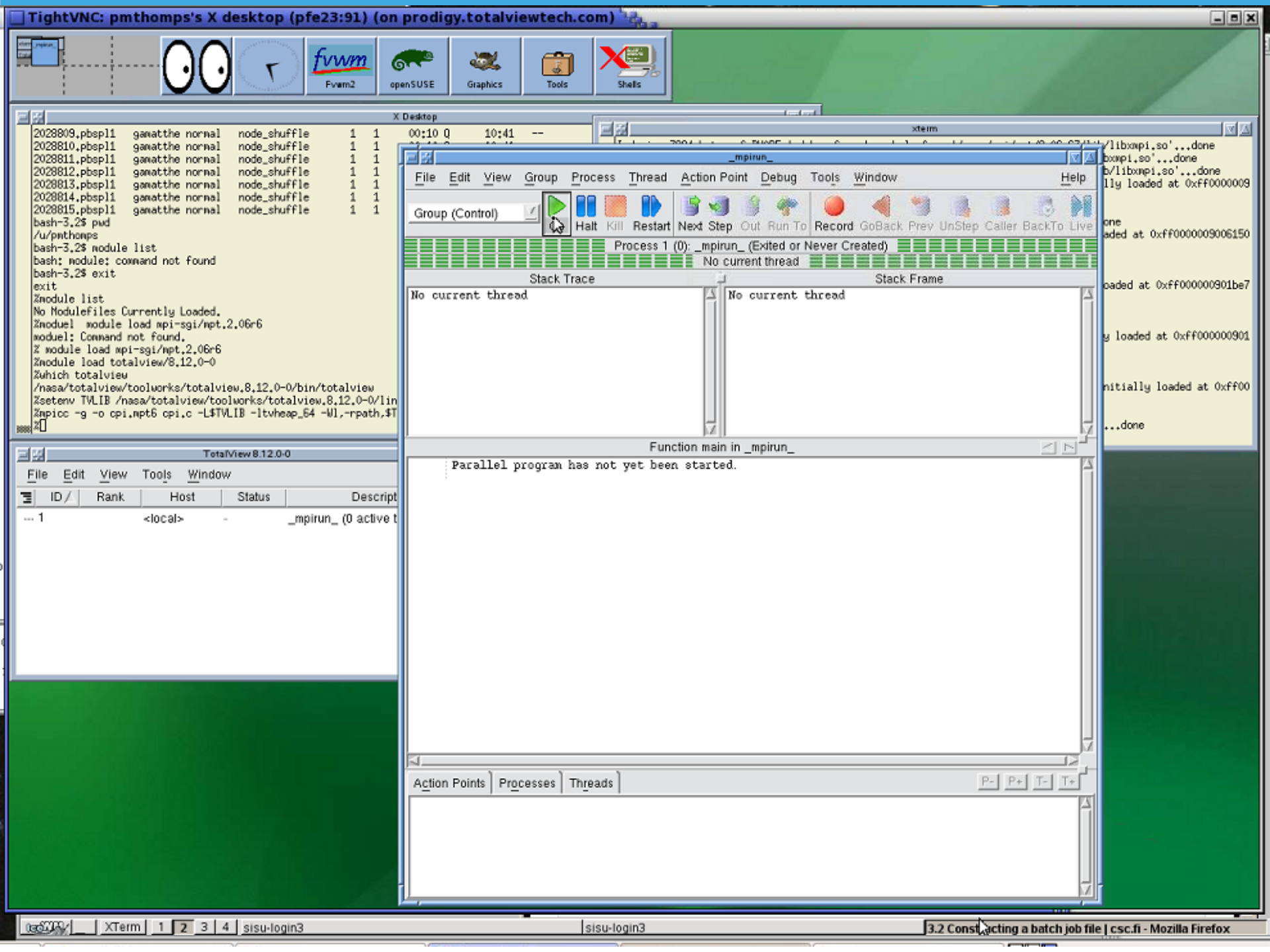
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%mpicc -g -o cpi.mpt6 cpi.c -L$TVLIB -ltvheap_64 -Wl,-rpath,$T
%
xterm
TotalView 8.12.0-0
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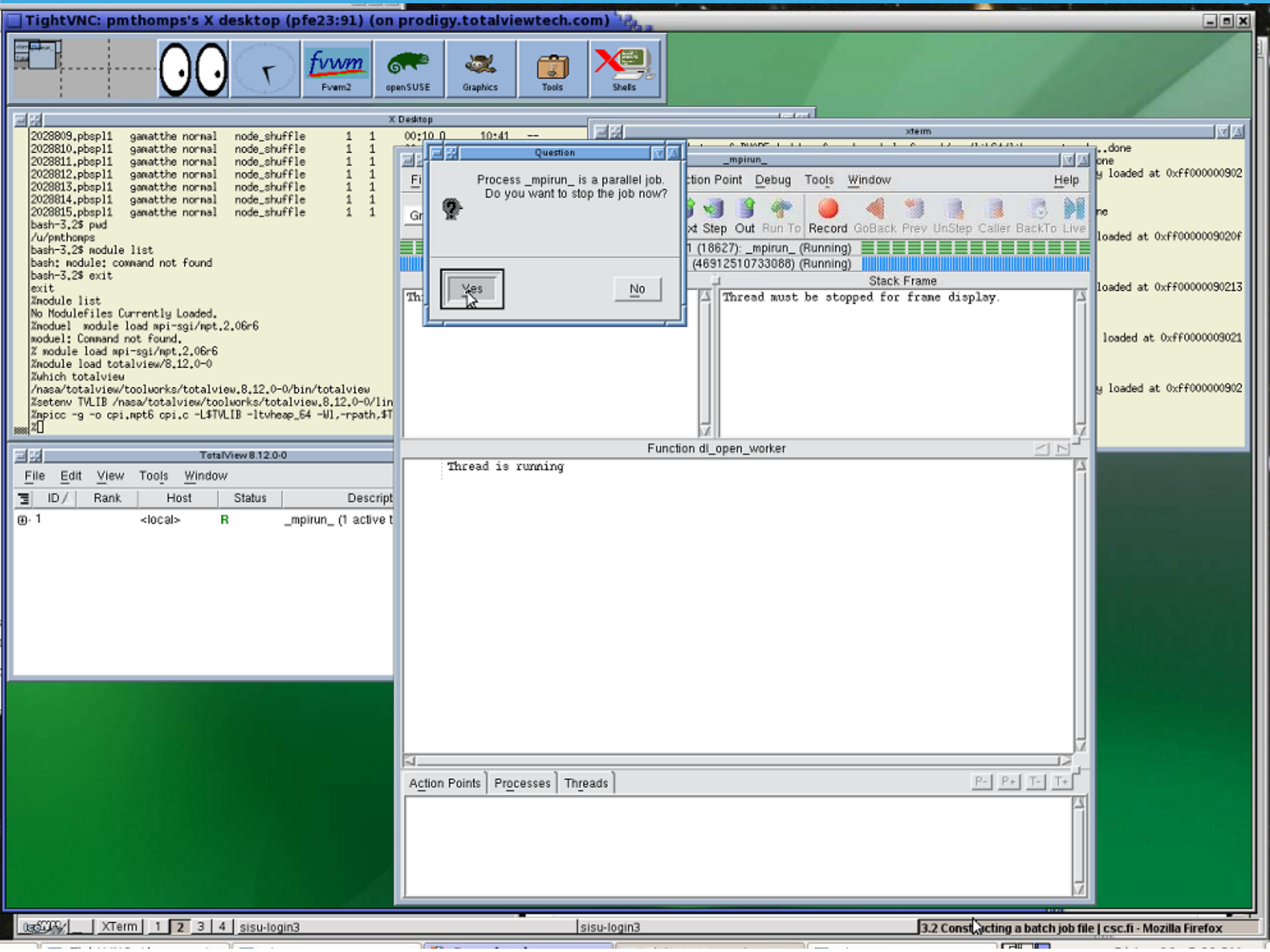
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%mpicc -g -o cpi.mpt6 cpi.c -L$TVLIB -ltvheap_64 -Wl,-rpath,$T
%
Question
Process _mpirun_ is a parallel job.
Do you want to stop the job now?
Yes
No
xterm
mpirun
Debug Tools Window Help
Step Out Run To Record GoBack Prev UnStep Caller BackTo Live
(18627): _mpirun_ (Running)
(46912510733088) (Running)
Stack Frame
Thread must be stopped for frame display.
Function dl_open_worker
Thread is running
Action Points Processes Threads
TotalView 8.12.0-0
File Edit View Tools Window
ID / Rank Host Status
1 <local> R _mpirun_ (1 active t
XTerm 1 2 3 4 sisu-login3
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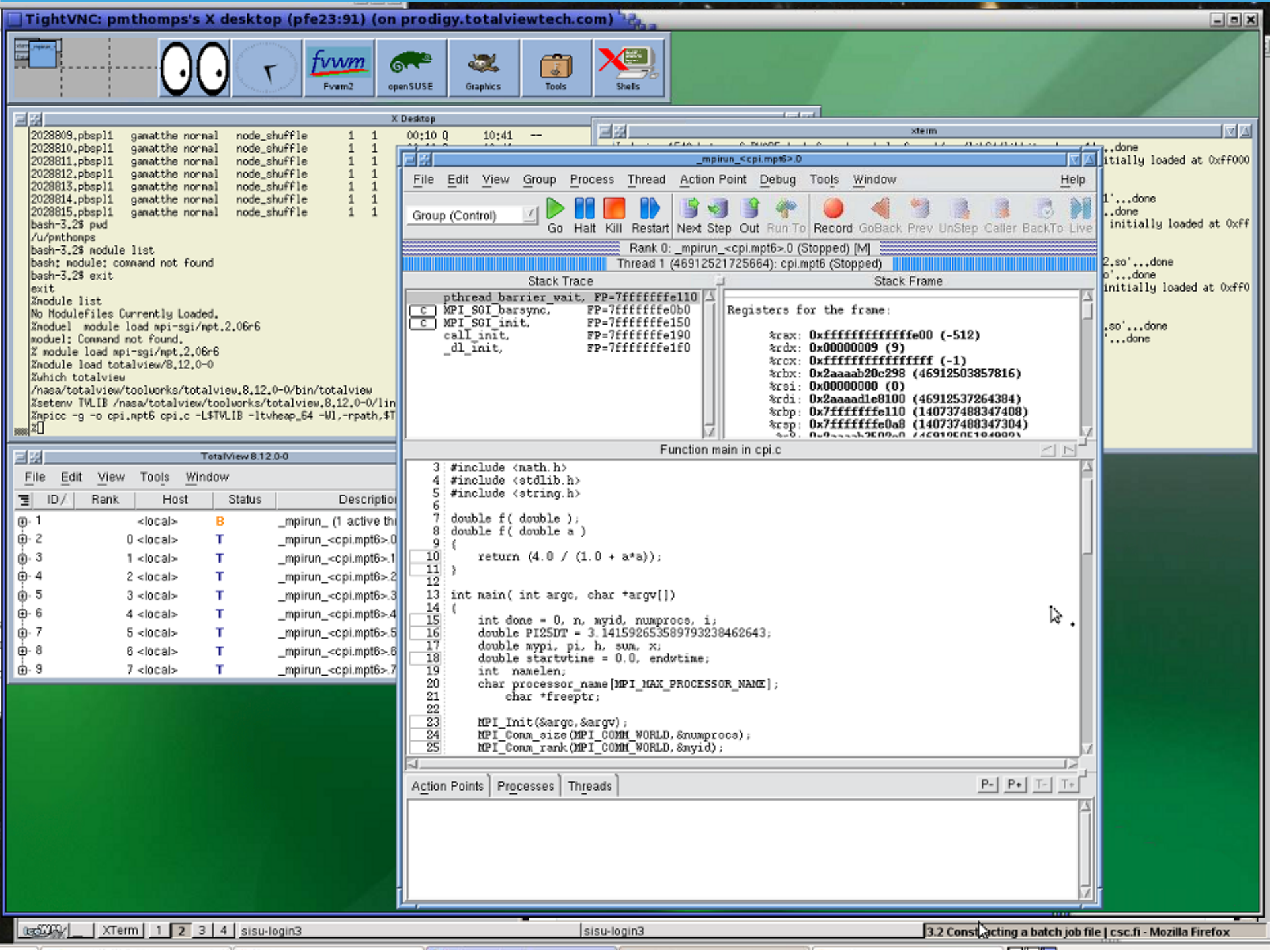
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..done
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2.so'...done
o'...done
initially loaded at 0xff0
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TotalView 8.12.0-0
File Edit View Tools Window
ID / Rank Host Status Description
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2 0 <local> T _mpirun_<cpi.mpt6>.0
3 1 <local> T _mpirun_<cpi.mpt6>.1
4 2 <local> T _mpirun_<cpi.mpt6>.2
5 3 <local> T _mpirun_<cpi.mpt6>.3
6 4 <local> T _mpirun_<cpi.mpt6>.4
7 5 <local> T _mpirun_<cpi.mpt6>.5
8 6 <local> T _mpirun_<cpi.mpt6>.6
9 7 <local> T _mpirun_<cpi.mpt6>.7
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File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
Go Halt Kill Restart Next Step Out Run To Record GoBack Prev UnStep Caller BackTo Live
Rank 0: _mpirun_<cpi.mpt6>.0 (Stopped) [M]
Thread 1 (46912521725664): cpi.mpt6 (Stopped)
Stack Trace
pthread_barrier_wait, FP=7fffffffe110
C MPI_SGI_barsync, FP=7fffffffe0b0
C MPI_SGI_init, FP=7fffffffe150
call_init, FP=7fffffffe190
_dl_init, FP=7fffffffe1f0
Stack Frame
Registers for the frame:
%rax: 0xffffffffffffe00 (-512)
%rdx: 0x00000009 (9)
%rcx: 0xffffffffffffffff (-1)
%rbx: 0x2aaaab20c298 (46912503857816)
%rsi: 0x00000000 (0)
%rdi: 0x2aaaad1e8100 (46912537264384)
%rbp: 0x7fffffffe110 (140737488347408)
%rsp: 0x7fffffffe0a8 (140737488347304)
Function main in cpi.c
3 #include <math.h>
4 #include <stdlib.h>
5 #include <string.h>
6
7 double f(double);
8 double f(double a)
9 {
10 return (4.0 / (1.0 + a*a));
11 }
12
13 int main(int argc, char *argv[])
14 {
15 int done = 0, n, myid, numprocs, i;
16 double PI25DT = 3.14159265358979323846264643;
17 double mypi, pi, h, sum, x;
18 double startwtime = 0.0, endwtime;
19 int namelen;
20 char processor_name[MPI_MAX_PROCESSOR_NAME];
21 char *freeptr;
22
23 MPI_Init(&argc,&argv);
24 MPI_Comm_size(MPI_COMM_WORLD,&numprocs);
25 MPI_Comm_rank(MPI_COMM_WORLD,&myid);
Action Points Processes Threads
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sisu-login3
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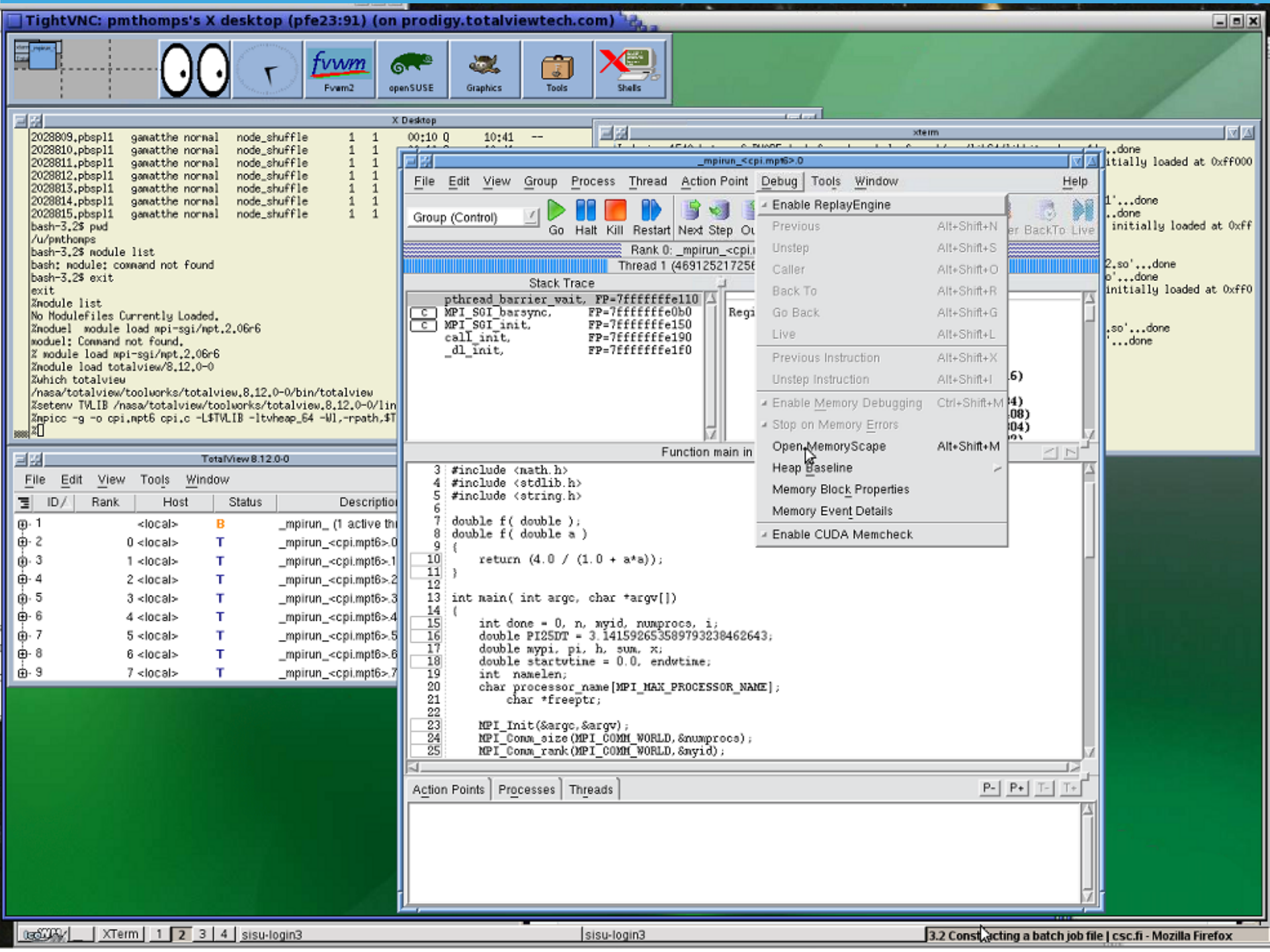
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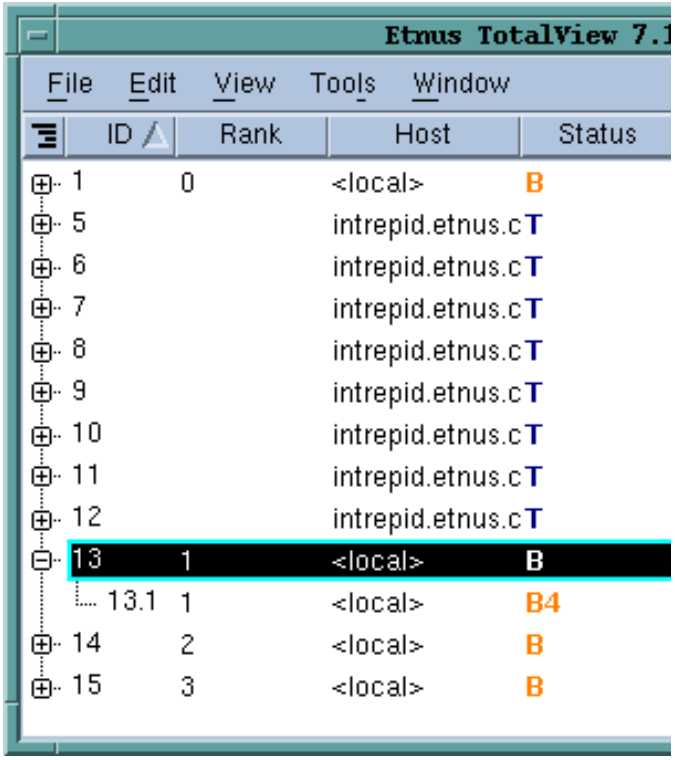
%which totalview
/nasa/totalview/toolworks/totalview.8.12.0-0/bin/totalview
%setenv TVLIB /nasa/totalview/toolworks/totalview.8.12.0-0/lin
%mpicc -g -o cpi.mpt6 cpi.c -L$TVLIB -ltvheap_64 -Wl,-rpath,$T
%
xterm
..done
itially loaded at 0xff000
1'...done
..done
initially loaded at 0xff
2.so'...done
o'...done
initially loaded at 0xff0
.so'...done
'...done
TotalView 8.12.0-0
File Edit View Tools Window
ID / Rank Host Status Description
1 <local> B _mpirun_ (1 active th
2 0 <local> T _mpirun_<cpi.mpt6>.0
3 1 <local> T _mpirun_<cpi.mpt6>.1
4 2 <local> T _mpirun_<cpi.mpt6>.2
5 3 <local> T _mpirun_<cpi.mpt6>.3
6 4 <local> T _mpirun_<cpi.mpt6>.4
7 5 <local> T _mpirun_<cpi.mpt6>.5
8 6 <local> T _mpirun_<cpi.mpt6>.6
9 7 <local> T _mpirun_<cpi.mpt6>.7
mpirun<cpi.mpt6>.0
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
Go Halt Kill Restart Next Step Ou
Rank 0: _mpirun_<cpi.
Thread 1 (469125217256
Stack Trace
pthread_barrier_wait, FP=7fffffffe110
MPI_SGI_barsync, FP=7fffffffe0b0
MPI_SGI_init, FP=7fffffffe150
call_init, FP=7fffffffe190
_dl_init, FP=7fffffffe1f0
Enable ReplayEngine
Previous Alt+Shift+N
Unstep Alt+Shift+S
Caller Alt+Shift+O
Back To Alt+Shift+R
Go Back Alt+Shift+G
Live Alt+Shift+L
Previous Instruction Alt+Shift+X
Unstep Instruction Alt+Shift+I
Enable Memory Debugging Ctrl+Shift+M
Stop on Memory Errors
Open MemoryScape Alt+Shift+M
Heap Baseline
Memory Block Properties
Memory Event Details
Enable CUDA Memcheck
Function main in
3 #include <math.h>
4 #include <stdlib.h>
5 #include <string.h>
6
7 double f(double);
8 double f(double a)
9 {
10 return (4.0 / (1.0 + a*a));
11 }
12
13 int main(int argc, char *argv[])
14 {
15 int done = 0, n, myid, numprocs, i;
16 double PI25DT = 3.14159265358979323846264643;
17 double mypi, pi, h, sum, x;
18 double startwtime = 0.0, endwtime;
19 int namelen;
20 char processor_name[MPI_MAX_PROCESSOR_NAME];
21 char *freeptr;
22
23 MPI_Init(&argc,&argv);
24 MPI_Comm_size(MPI_COMM_WORLD,&numprocs);
25 MPI_Comm_rank(MPI_COMM_WORLD,&myid);
Action Points Processes Threads
P- P+ T- T+
XTerm 1 2 3 4 sisu-login3
sisu-login3
3.2 Constructing a batch job file | csc.fi - Mozilla Firefox

Root Window

- State of all processes being debugged
- Process and Thread status
- Instant navigation access
- Sort and aggregate by status

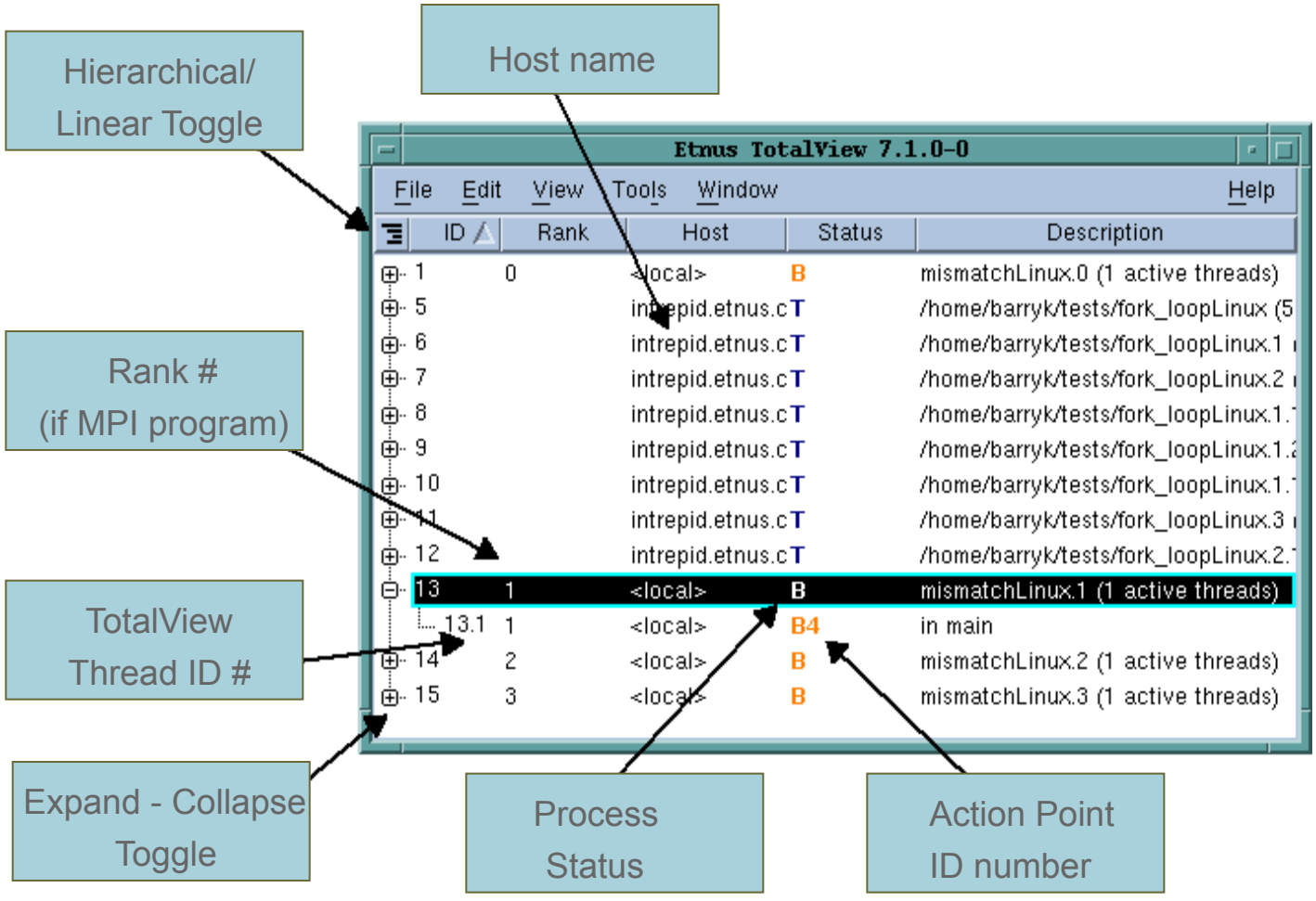


➤**Status Info**

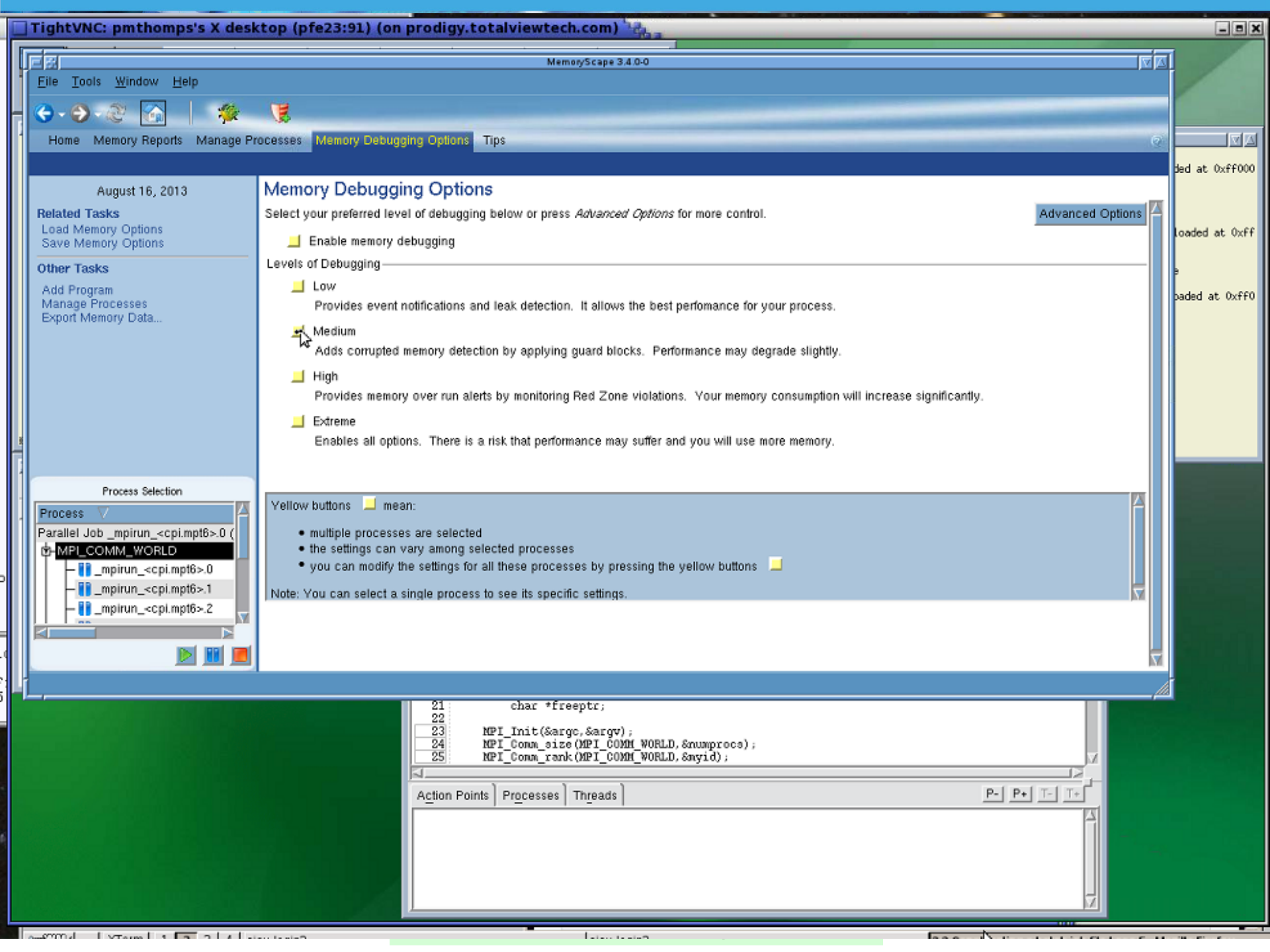
- T = stopped
- B = Breakpoint
- E = Error
- W = Watchpoint
- R = Running
- M = Mixed
- H = Held

Question? Use the Webex chat facility to ask the Host

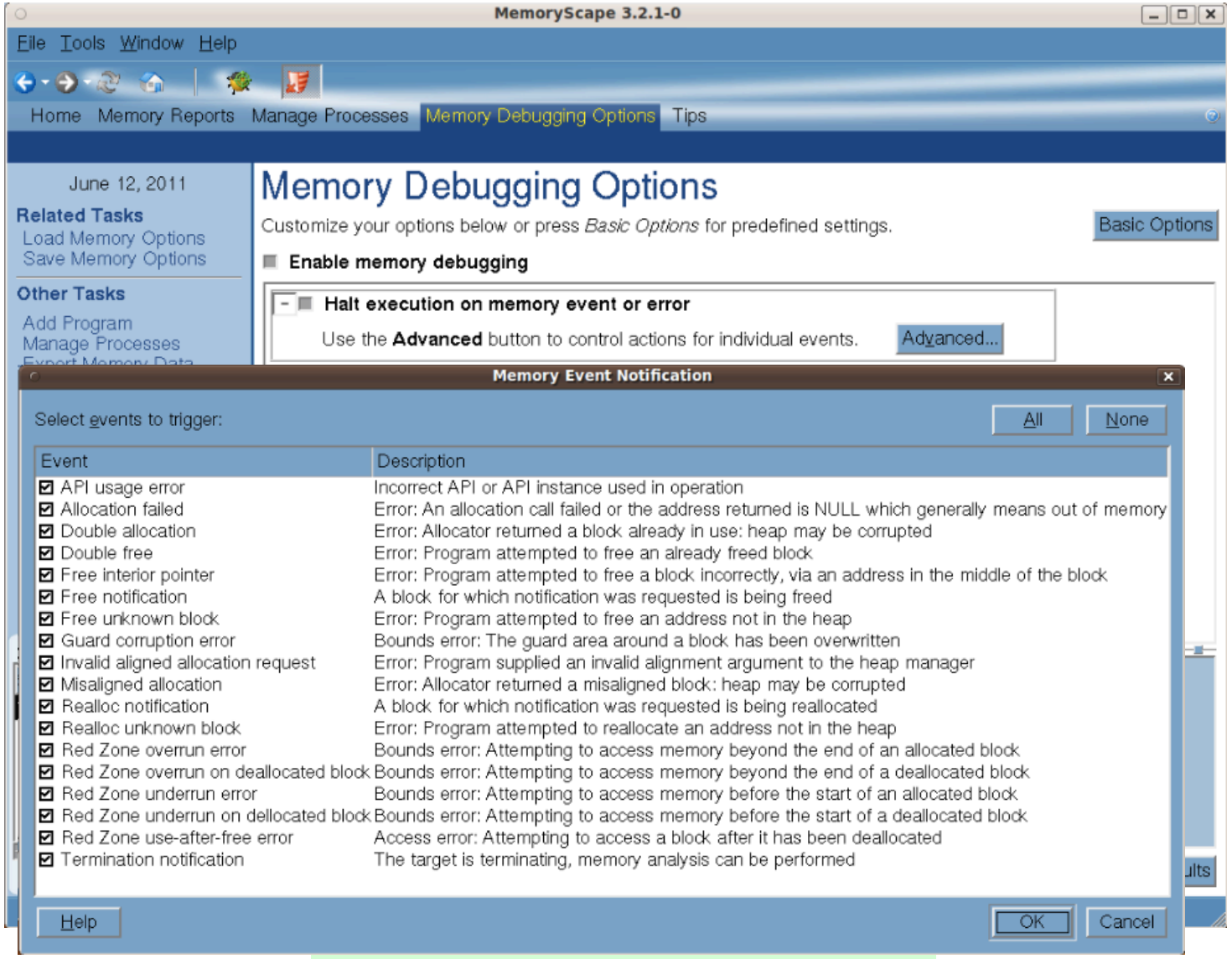
TotalView Root Window



Question? Use the Webex chat facility to ask the Host

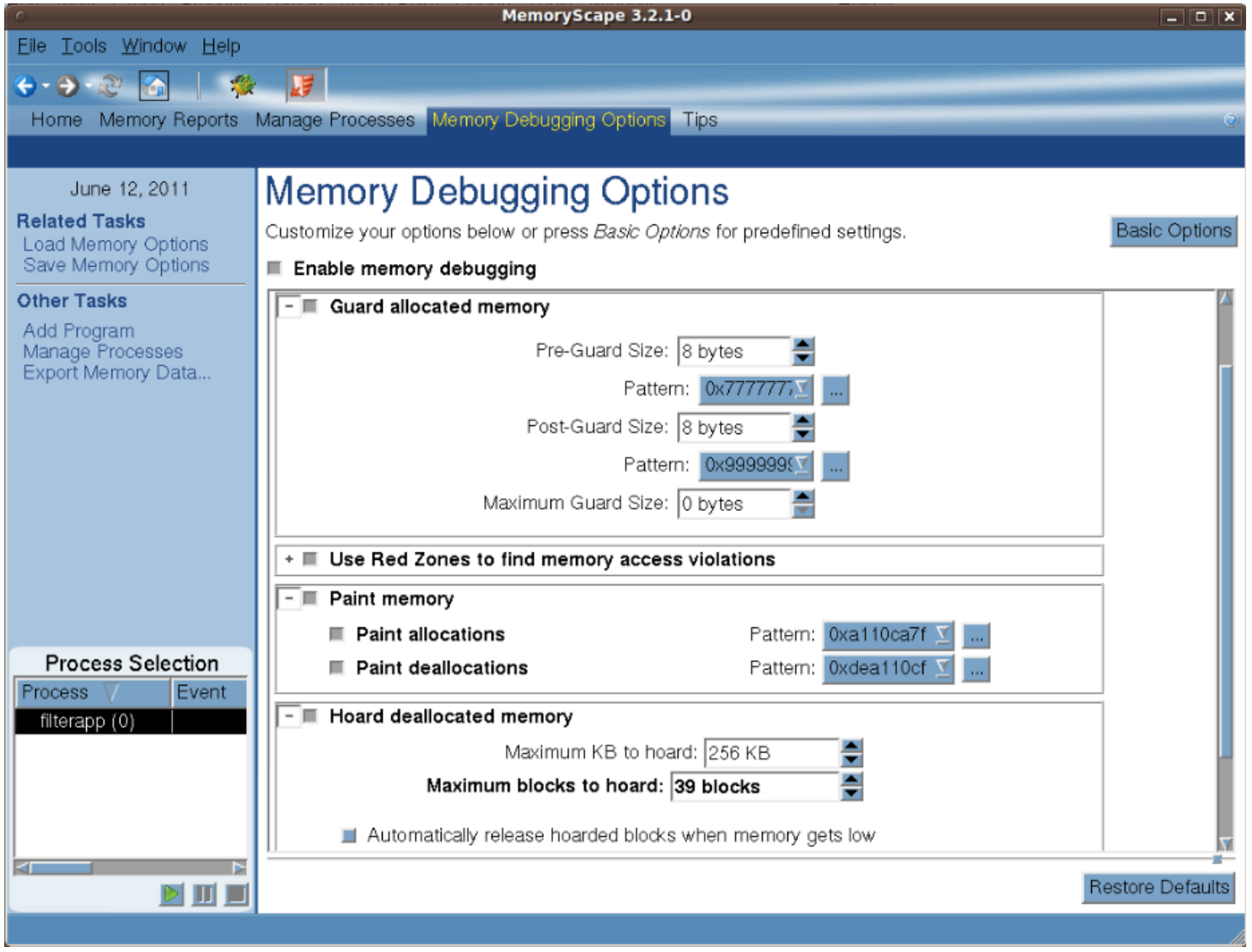

TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
MemoryScape 3.4.0-0
File Tools Window Help
Home Memory Reports Manage Processes Memory Debugging Options Tips
August 16, 2013
Related Tasks
Load Memory Options
Save Memory Options
Other Tasks
Add Program
Manage Processes
Export Memory Data...
Memory Debugging Options
Select your preferred level of debugging below or press Advanced Options for more control.
Advanced Options
Enable memory debugging
Levels of Debugging
Low
Provides event notifications and leak detection. It allows the best perfomance for your process.
Medium
Adds corrupted memory detection by applying guard blocks. Performance may degrade slightly.
High
Provides memory over run alerts by monitoring Red Zone violations. Your memory consumption will increase significantly.
Extreme
Enables all options. There is a risk that performance may suffer and you will use more memory.
Yellow buttons mean:
multiple processes are selected
the settings can vary among selected processes
you can modify the settings for all these processes by pressing the yellow buttons
Note: You can select a single process to see its specific settings.
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
char *freeptr;
MPI_Init(&argc,&argv);
MPI_Comm_size(MPI_COMM_WORLD,&numprocs);
MPI_Comm_rank(MPI_COMM_WORLD,&myid);
Action Points
Processes
Threads
P-
P+
T-
T+

Memory Debugging Options - Advanced

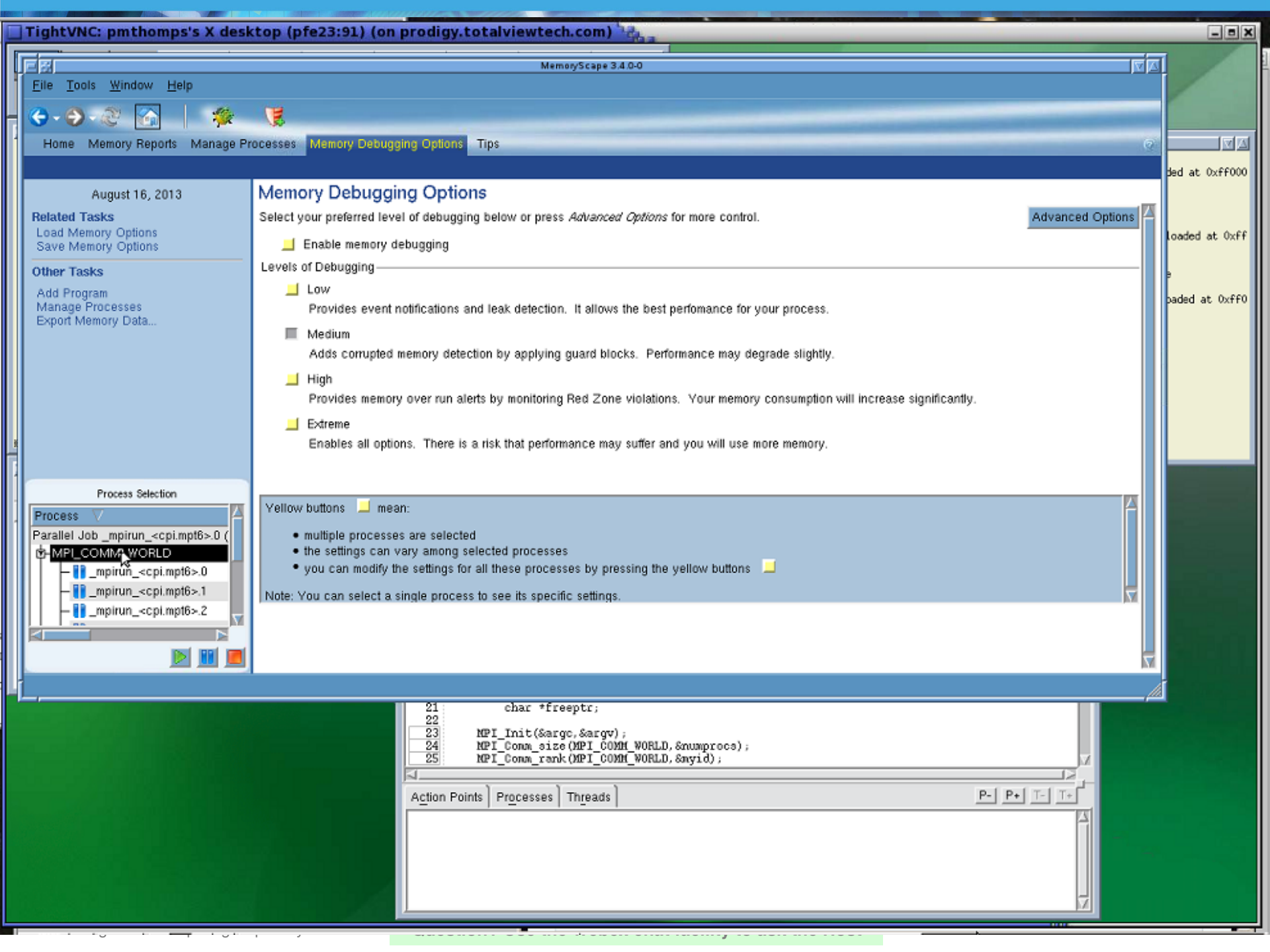


Question? Use the Webex chat facility to ask the Host

Memory Debugging Options - Advanced



Question? Use the Webex chat facility to ask the Host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MemoryScape 3.4.0-0
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MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
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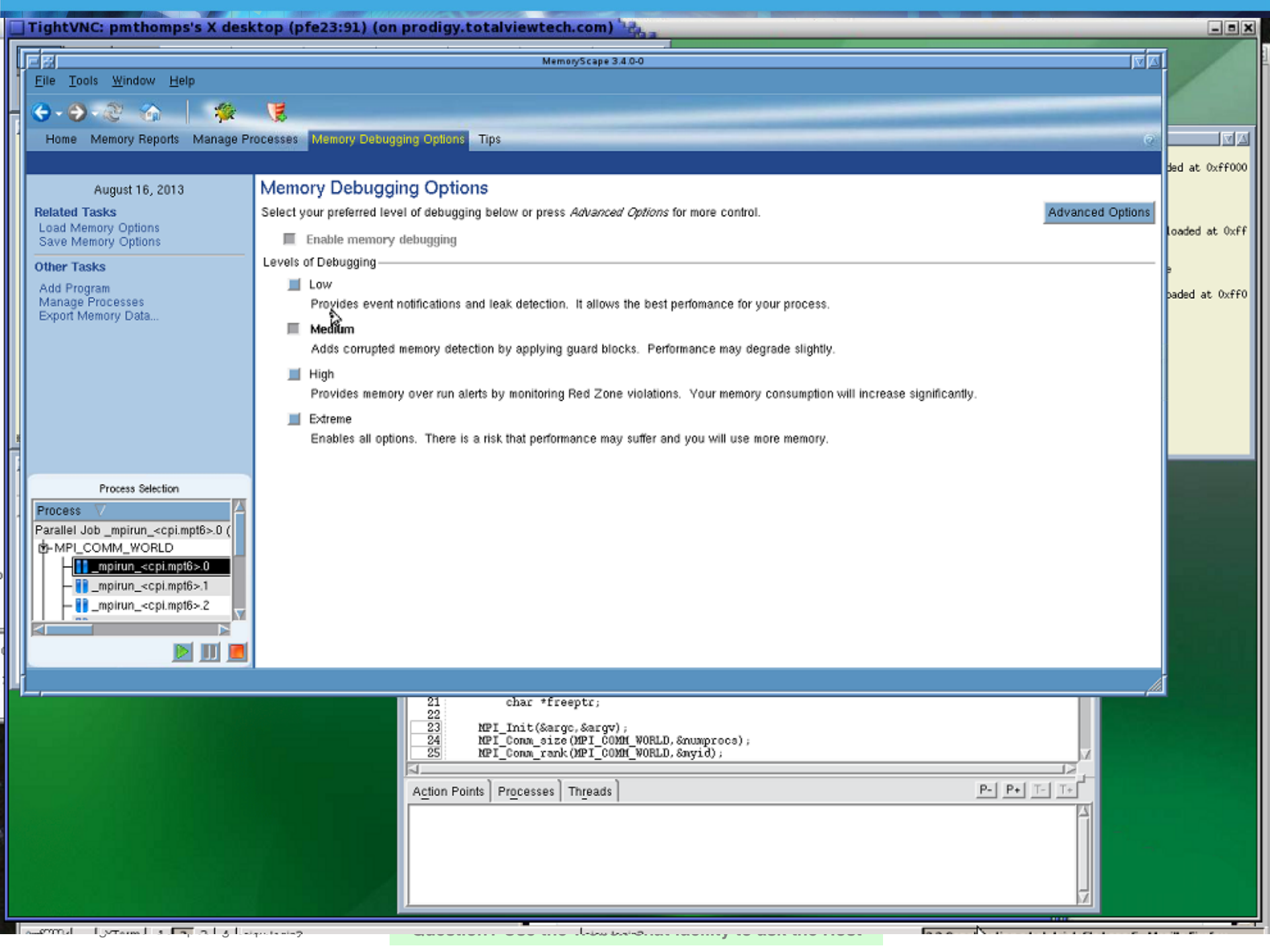
MPI_Init(&argc,&argv);
MPI_Comm_size(MPI_COMM_WORLD,&numprocs);
MPI_Comm_rank(MPI_COMM_WORLD,&myid);
Action Points
Processes
Threads
P-
P+
T-
T+


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
MemoryScape 3.4.0-0
File Tools Window Help
Home Memory Reports Manage Processes Memory Debugging Options Tips
August 16, 2013
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MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
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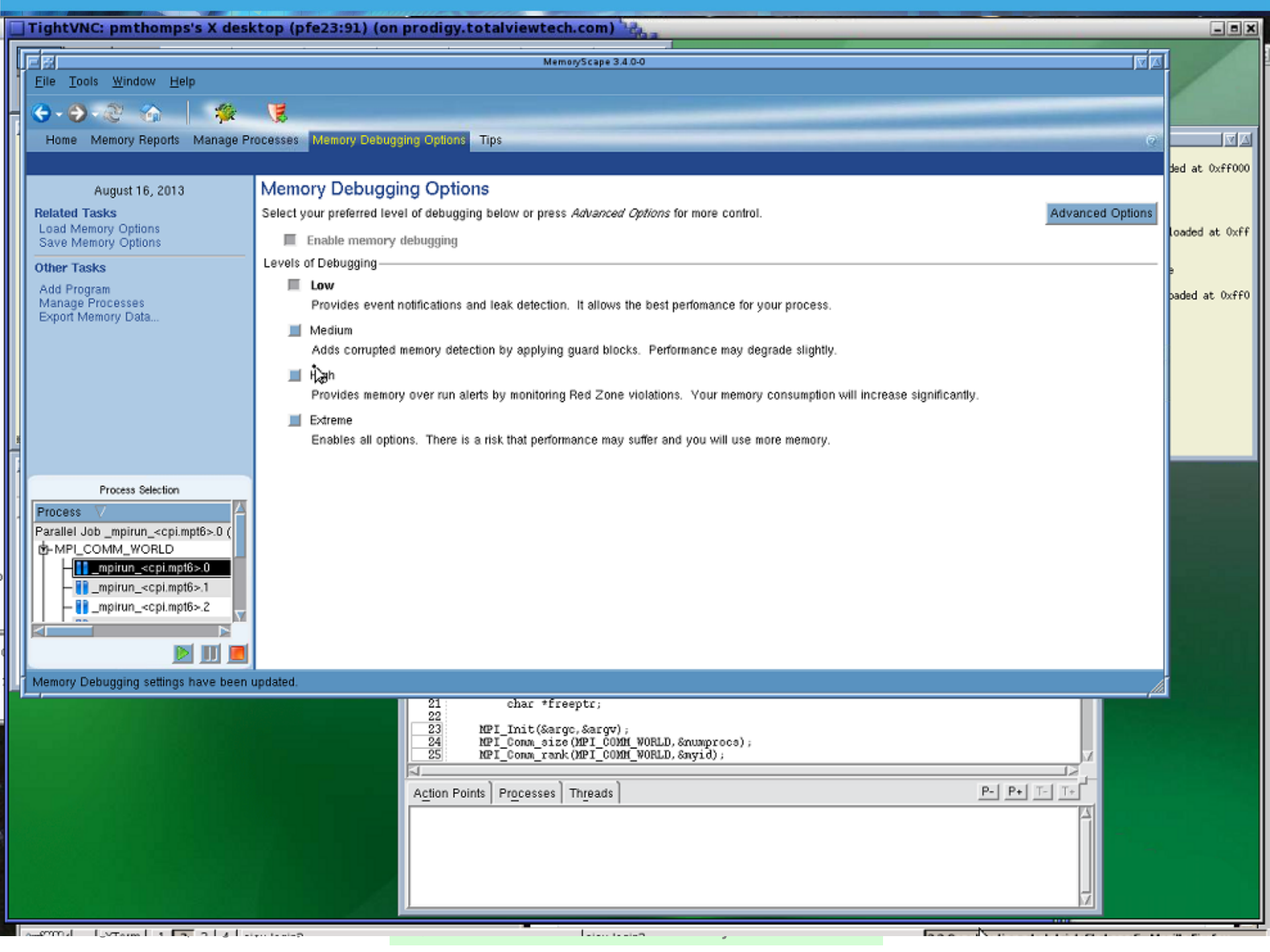
MPI_Init(&argc,&argv);
MPI_Comm_size(MPI_COMM_WORLD,&numprocs);
MPI_Comm_rank(MPI_COMM_WORLD,&myid);
Action Points
Processes
Threads
P-
P+
T-
T+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File Tools Window Help
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August 16, 2013
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Export Memory Data...
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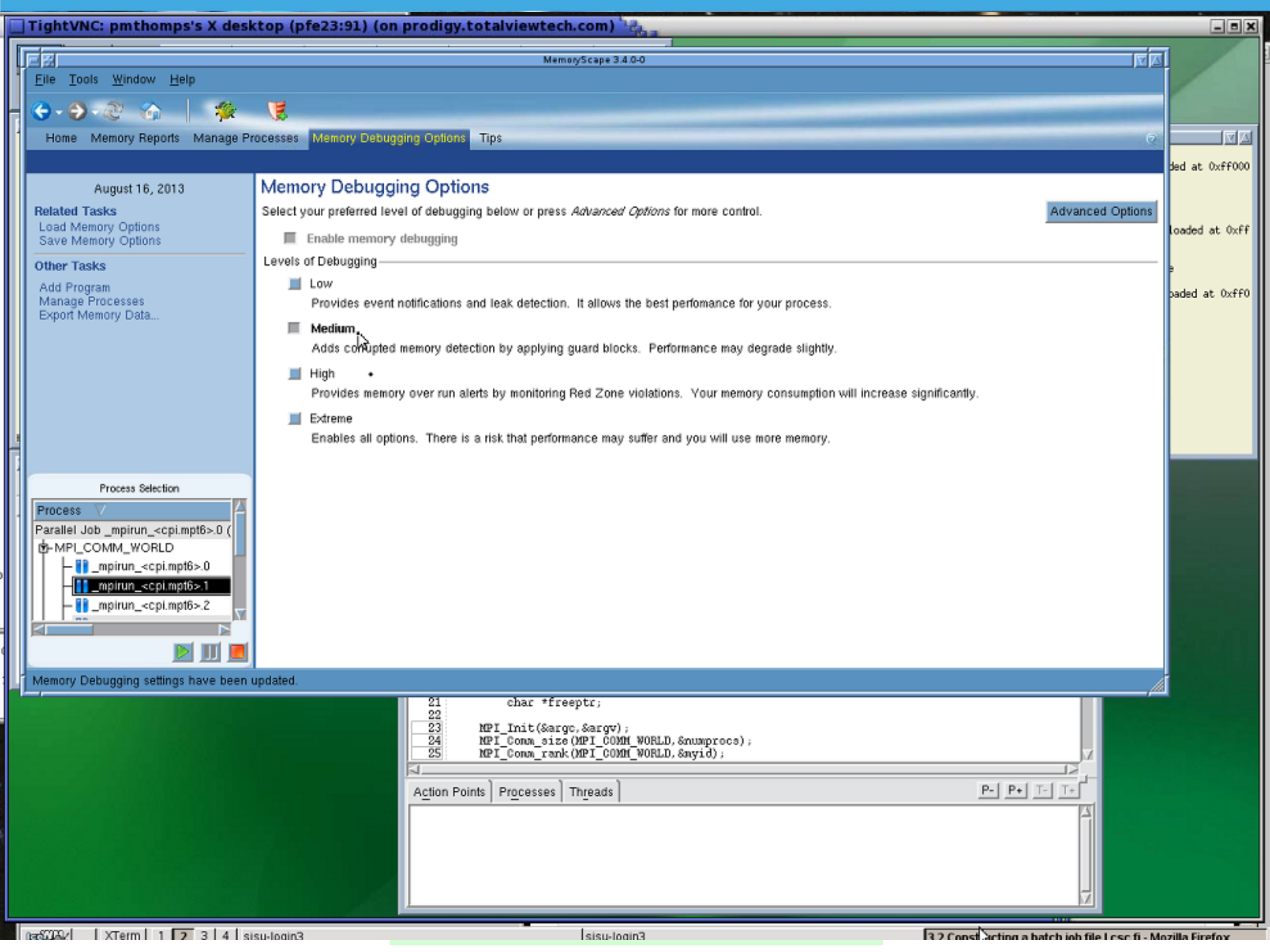
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
Memory Debugging settings have been updated.
char *freeptr;
MPI_Init(&argc,&argv);
MPI_Comm_size(MPI_COMM_WORLD,&numprocs);
MPI_Comm_rank(MPI_COMM_WORLD,&myid);
Action Points
Processes
Threads
P-
P+
T-
T+


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
MemoryScape 3.4.0-0
File Tools Window Help
Home Memory Reports Manage Processes Memory Debugging Options Tips
August 16, 2013
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Other Tasks
Add Program
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Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
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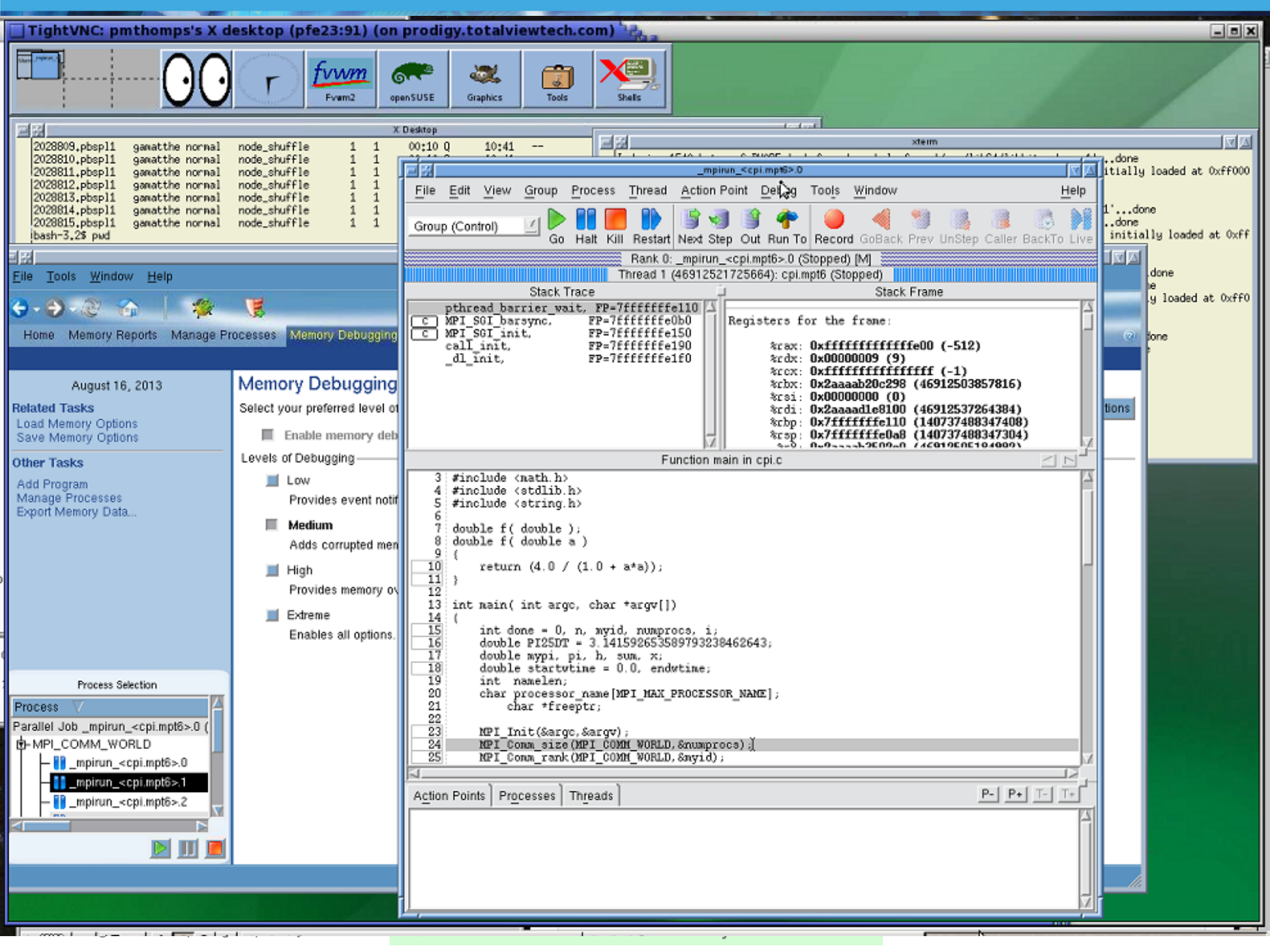
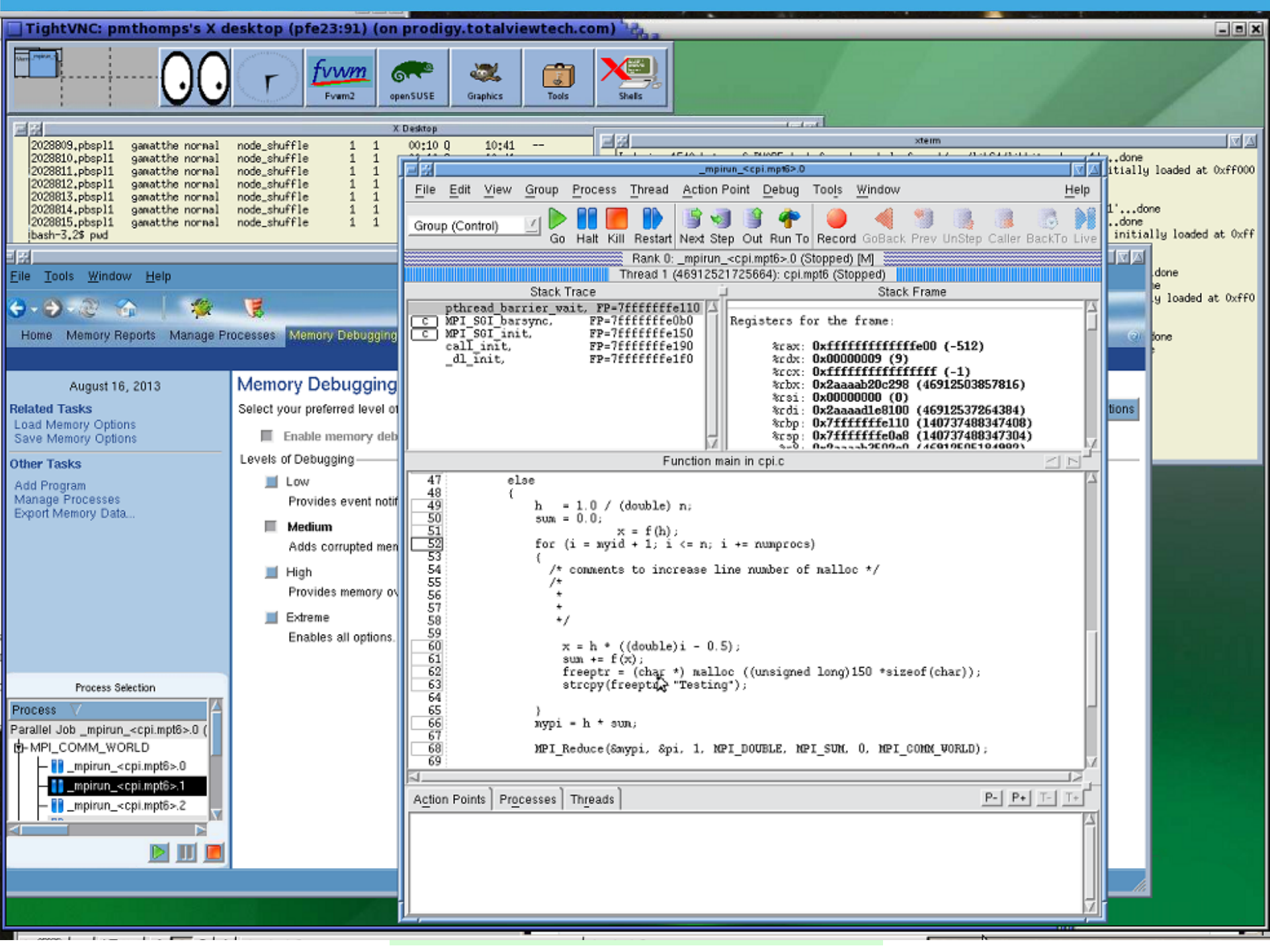
MPI_Init(&argc,&argv);
MPI_Comm_size(MPI_COMM_WORLD,&numprocs);
MPI_Comm_rank(MPI_COMM_WORLD,&myid);
Action Points
Processes
Threads
XTerm
sisu-login3
sisu-login3


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
fvwm
Fvwm2
openSUSE
Graphics
Tools
Shells
X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
2028811.pbspl1 gamatthe normal node_shuffle 1 1
2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
ibash-3.2$ pwd
xterm
mpirun<cpi.mpt6>.0
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
Go Halt Kill Restart Next Step Out Run To Record GoBack Prev UnStep Caller BackTo Live
Rank 0: _mpirun_<cpi.mpt6>.0 (Stopped) [M]
Thread 1 (46912521725664): cpi.mpt6 (Stopped)
Stack Trace
pthread_barrier_wait, FP=7fffffffe110
MPI_SGI_barsync, FP=7fffffffe0b0
MPI_SGI_init, FP=7fffffffe150
call_init, FP=7fffffffe190
_dl_init, FP=7fffffffe1f0
Stack Frame
Registers for the frame:
%rax: 0xffffffffffffe00 (-512)
%rdx: 0x00000009 (9)
%rcx: 0xffffffffffffffff (-1)
%rbx: 0x2aaaab20c298 (46912503857816)
%rsi: 0x00000000 (0)
%rdi: 0x2aaaad1e8100 (46912537264384)
%rbp: 0x7fffffffe110 (140737488347408)
%rsp: 0x7fffffffe0a8 (140737488347304)
Function main in cpi.c
3 #include <math.h>
4 #include <stdlib.h>
5 #include <string.h>
6
7 double f(double);
8 double f(double a)
9 {
10 return (4.0 / (1.0 + a*a));
11 }
12
13 int main(int argc, char *argv[])
14 {
15 int done = 0, n, myid, numprocs, i;
16 double PI25DT = 3.14159265358979323846264 3;
17 double mypi, pi, h, sum, x;
18 double startwtime = 0.0, endwtime;
19 int namelen;
20 char processor_name[MPI_MAX_PROCESSOR_NAME];
21 char *freeptr;
22
23 MPI_Init(&argc,&argv);
24 MPI_Comm_size(MPI_COMM_WORLD,&numprocs);
25 MPI_Comm_rank(MPI_COMM_WORLD,&myid);
Action Points Processes Threads
P- P+ T- T+
File Tools Window Help
Home Memory Reports Manage Processes Memory Debugging
August 16, 2013
Related Tasks
Load Memory Options
Save Memory Options
Other Tasks
Add Program
Manage Processes
Export Memory Data...
Memory Debugging
Select your preferred level of
Enable memory deb
Levels of Debugging
Low
Provides event notif
Medium
Adds corrupted mem
High
Provides memory ov
Extreme
Enables all options.
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
fvwm
Fvwm2
openSUSE
Graphics
Tools
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X Desktop
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File Edit View Group Process Thread Action Point Debug Tools Window Help
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%rcx: 0xffffffffffffffff (-1)
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%rsi: 0x00000000 (0)
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%rsp: 0x7fffffffe0a8 (140737488347304)
Function main in cpi.c
47 else
48 {
49 h = 1.0 / (double) n;
50 sum = 0.0;
51 x = f(h);
52 for (i = myid + 1; i <= n; i += numprocs)
53 {
54 /* comments to increase line number of malloc */
55 /*
56 *
57 *
58 */
59
60 x = h * ((double)i - 0.5);
61 sum += f(x);
62 freeptr = (char *) malloc ((unsigned long)150 *sizeof(char));
63 strcpy(freeptr, "Testing");
64
65 }
66 mypi = h * sum;
67
68 MPI_Reduce(&mypi, &pi, 1, MPI_DOUBLE, MPI_SUM, 0, MPI_COMM_WORLD);
69
Action Points Processes Threads
P- P+ T- T+
File Tools Window Help
Home Memory Reports Manage Processes Memory Debugging
August 16, 2013
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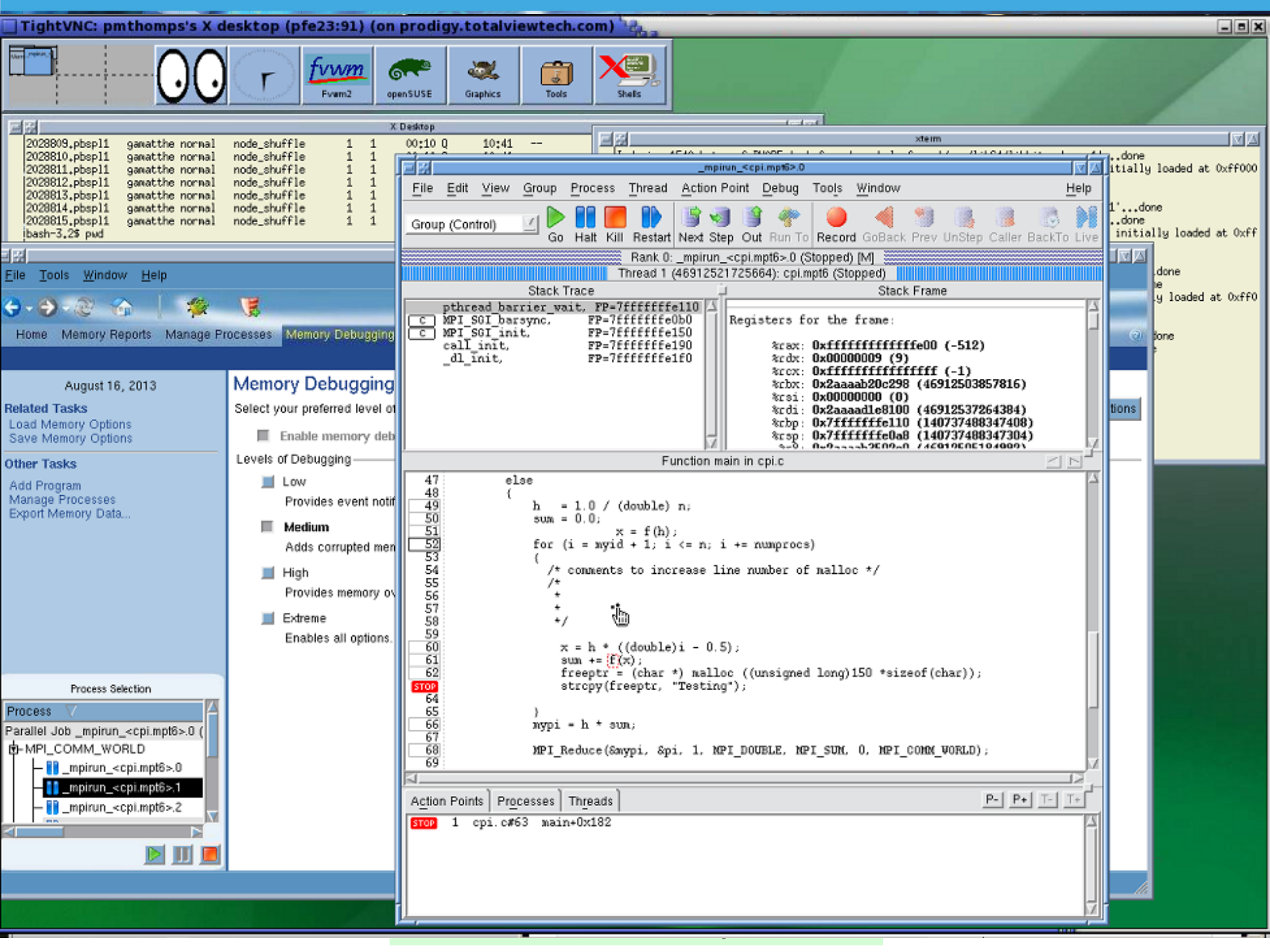
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2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51 x = f(h);
52 for (i = myid + 1; i <= n; i += numprocs)
53 {
54 /* comments to increase line number of malloc */
55 /*
56 *
57 *
58 */
59
60 x = h * ((double)i - 0.5);
61 sum += f(x);
62 freeptr = (char *) malloc ((unsigned long)150 *sizeof(char));
STOP strcpy(freeptr, "Testing");
64
65 }
66 mypi = h * sum;
67
68 MPI_Reduce(&mypi, &pi, 1, MPI_DOUBLE, MPI_SUM, 0, MPI_COMM_WORLD);
69
Action Points Processes Threads
P- P+ T- T+
STOP 1 cpi.c#63 main+0x182
File Tools Window Help
Home Memory Reports Manage Processes Memory Debugging
August 16, 2013
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Other Tasks
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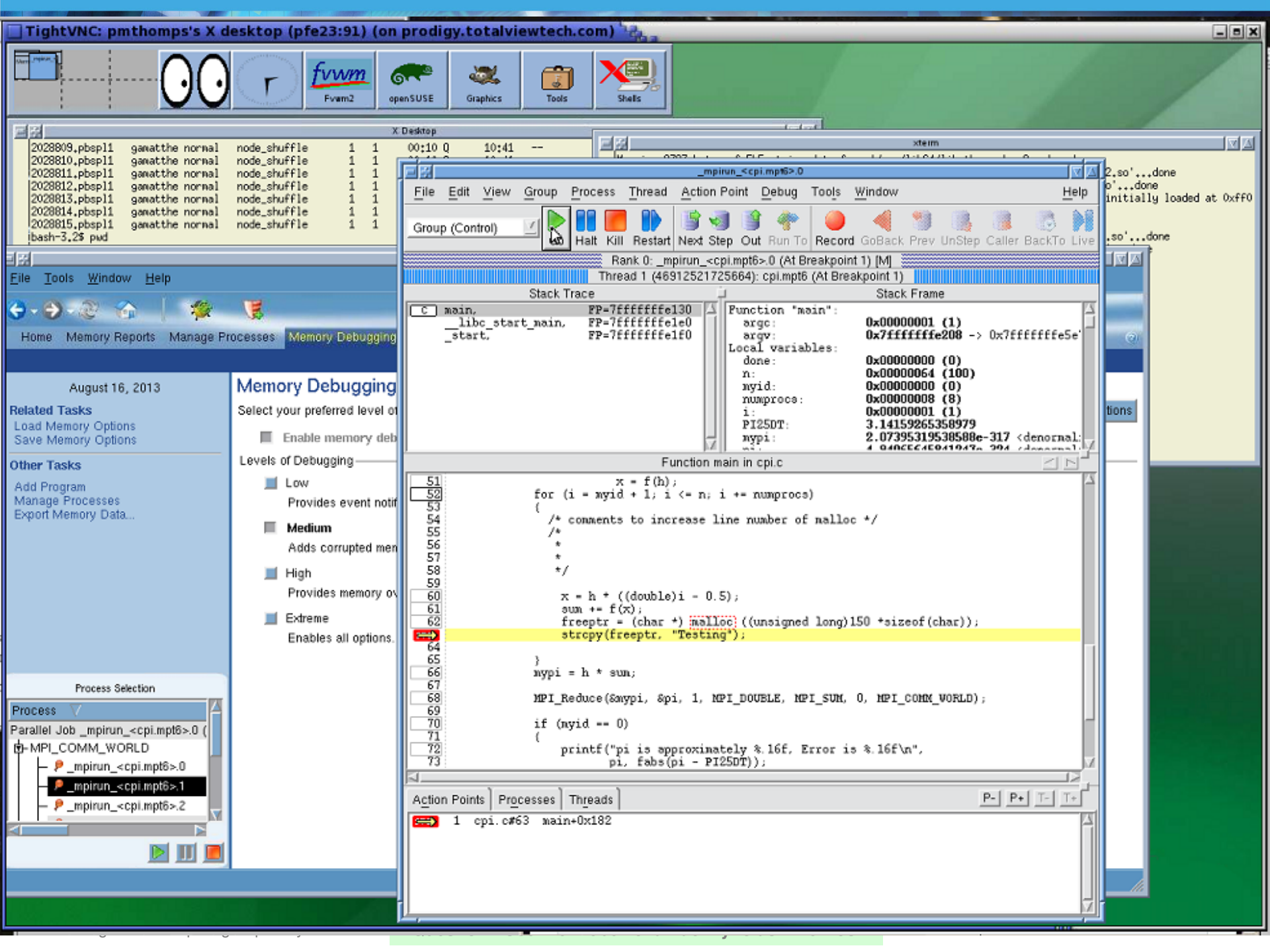
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2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2028810.pbspl1 gamatthe normal node_shuffle 1 1
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2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
bash-3.2$ pwd
xterm
2.so'...done
o'...done
initially loaded at 0xff0
.so'...done
mpirun<cpi.mpt6>.0
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
Halt Kill Restart Next Step Out Run To Record GoBack Prev UnStep Caller BackTo Live
Rank 0: _mpirun_<cpi.mpt6>.0 (At Breakpoint 1) [M]
Thread 1 (46912521725664): cpi.mpt6 (At Breakpoint 1)
Stack Trace
main, FP=7fffffffe130
__libc_start_main, FP=7fffffffe1e0
_start, FP=7fffffffe1f0
Stack Frame
Function "main":
argc: 0x00000001 (1)
argv: 0x7fffffffe208 -> 0x7fffffffe5e
Local variables:
done: 0x00000000 (0)
n: 0x00000064 (100)
myid: 0x00000000 (0)
numprocs: 0x00000008 (8)
i: 0x00000001 (1)
PI25DT: 3.14159265358979
mypi: 2.07395319530588e-317 <denormal
Function main in cpi.c
51 x = f(h);
52 for (i = myid + 1; i <= n; i += numprocs)
53 {
54 /* comments to increase line number of malloc */
55 /*
56 *
57 *
58 */
59
60 x = h * ((double)i - 0.5);
61 sum += f(x);
62 freeptr = (char *) malloc ((unsigned long)150 *sizeof(char));
63 strcpy(freeptr, "Testing");
64
65 }
66 mypi = h * sum;
67
68 MPI_Reduce(&mypi, &pi, 1, MPI_DOUBLE, MPI_SUM, 0, MPI_COMM_WORLD);
69
70 if (myid == 0)
71 {
72 printf("pi is approximately %.16f, Error is %.16f\n",
73 pi, fabs(pi - PI25DT));
Action Points Processes Threads
P- P+ T- T+
1 cpi.c#63 main+0x182
File Tools Window Help
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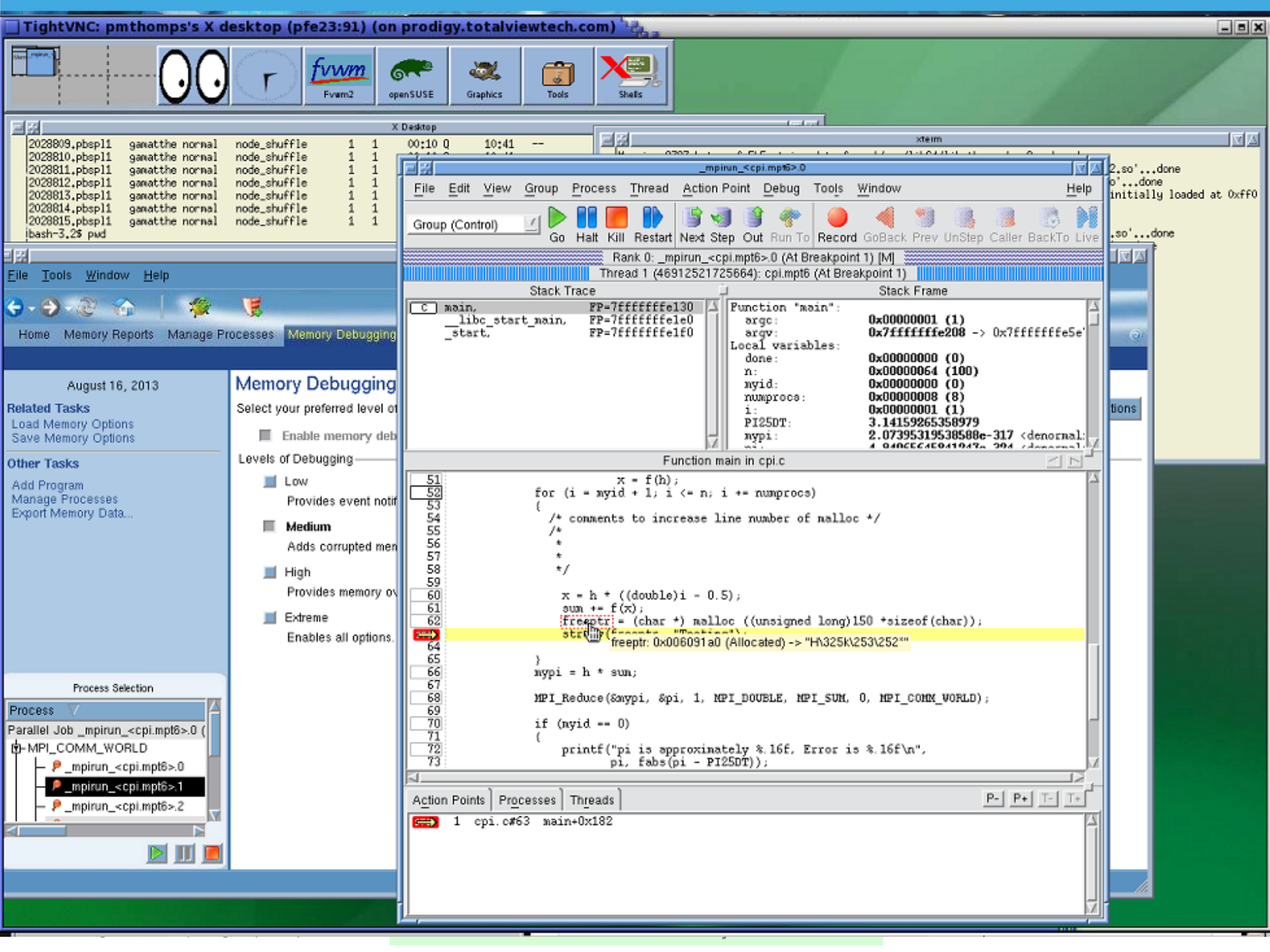
Save Memory Options
Other Tasks
Add Program
Manage Processes
Export Memory Data...
Memory Debugging
Select your preferred level of
Enable memory deb
Levels of Debugging
Low
Provides event notif
Medium
Adds corrupted mem
High
Provides memory ov
Extreme
Enables all options.
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
Fvwm2
openSUSE
Graphics
Tools
Shells
X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
2028811.pbspl1 gamatthe normal node_shuffle 1 1
2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
bash-3.2$ pwd
xterm
2.so'...done
o'...done
initially loaded at 0xff0
.so'...done
mpirun<cpi.mpt6>.0
File Edit View Group Process Thread Action Point Debug Tools Window Help
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Go Halt Kill Restart Next Step Out Run To Record GoBack Prev UnStep Caller BackTo Live
Rank 0: _mpirun_<cpi.mpt6>.0 (At Breakpoint 1) [M]
Thread 1 (46912521725664): cpi.mpt6 (At Breakpoint 1)
Stack Trace
main, FP=7fffffffe130
__libc_start_main, FP=7fffffffe0
_start, FP=7fffffffe1f0
Stack Frame
Function "main":
argc: 0x00000001 (1)
argv: 0x7fffffffe208 -> 0x7fffffffe5e
Local variables:
done: 0x00000000 (0)
n: 0x00000064 (100)
myid: 0x00000000 (0)
numprocs: 0x00000008 (8)
i: 0x00000001 (1)
PI25DT: 3.14159265358979
mypi: 2.07395319538588e-317 <denormal
Function main in cpi.c
51 x = f(h);
52 for (i = myid + 1; i <= n; i += numprocs)
53 {
54 /* comments to increase line number of malloc */
55 /*
56 *
57 *
58 */
59
60 x = h * ((double)i - 0.5);
61 sum += f(x);
62 freeptr = (char *) malloc ((unsigned long)150 *sizeof(char));
63 str
freeptr: 0x006091a0 (Allocated) -> "H\325k\253\252"
64
65 }
66 mypi = h * sum;
67
68 MPI_Reduce(&mypi, &pi, 1, MPI_DOUBLE, MPI_SUM, 0, MPI_COMM_WORLD);
69
70 if (myid == 0)
71 {
72 printf("pi is approximately %.16f, Error is %.16f\n",
73 pi, fabs(pi - PI25DT));
Action Points
Processes
Threads
P- P+ T- T+
1 cpi.c#63 main+0x182
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Select your preferred level of
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Levels of Debugging
Low
Provides event notif
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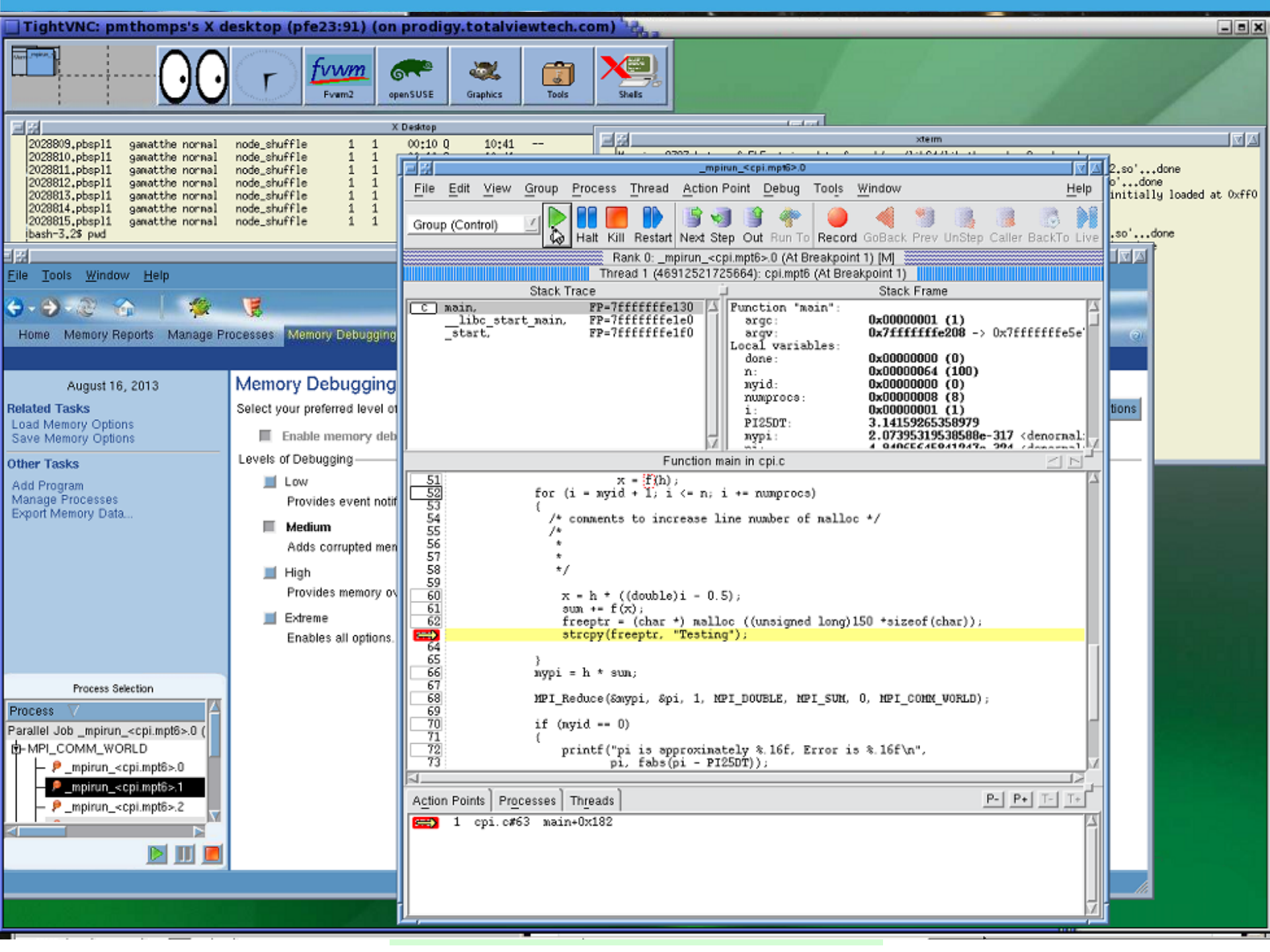
Provides memory ov
Extreme
Enables all options.
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
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X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
2028811.pbspl1 gamatthe normal node_shuffle 1 1
2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
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mpirun<cpi.mpt6>.0
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Thread 1 (46912521725664): cpi.mpt6 (At Breakpoint 1)
Stack Trace
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__libc_start_main, FP=7fffffffe0
_start, FP=7fffffffe1f0
Stack Frame
Function "main":
argc: 0x00000001 (1)
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Local variables:
done: 0x00000000 (0)
n: 0x00000064 (100)
myid: 0x00000000 (0)
numprocs: 0x00000008 (8)
i: 0x00000001 (1)
PI25DT: 3.14159265358979
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52 for (i = myid + 1; i <= n; i += numprocs)
53 {
54 /* comments to increase line number of malloc */
55 /*
56 *
57 *
58 */
59
60 x = h * ((double)i - 0.5);
61 sum += f(x);
62 freeptr = (char *) malloc ((unsigned long)150 *sizeof(char));
63 strcpy(freeptr, "Testing");
64
65 }
66 mypi = h * sum;
67
68 MPI_Reduce(&mypi, &pi, 1, MPI_DOUBLE, MPI_SUM, 0, MPI_COMM_WORLD);
69
70 if (myid == 0)
71 {
72 printf("pi is approximately %.16f, Error is %.16f\n",
73 pi, fabs(pi - PI25DT));
Action Points Processes Threads
P- P+ T- T+
1 cpi.c#63 main+0x182
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Select your preferred level of
Enable memory deb
Levels of Debugging
Low
Provides event notif
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Adds corrupted mem
High
Provides memory ov
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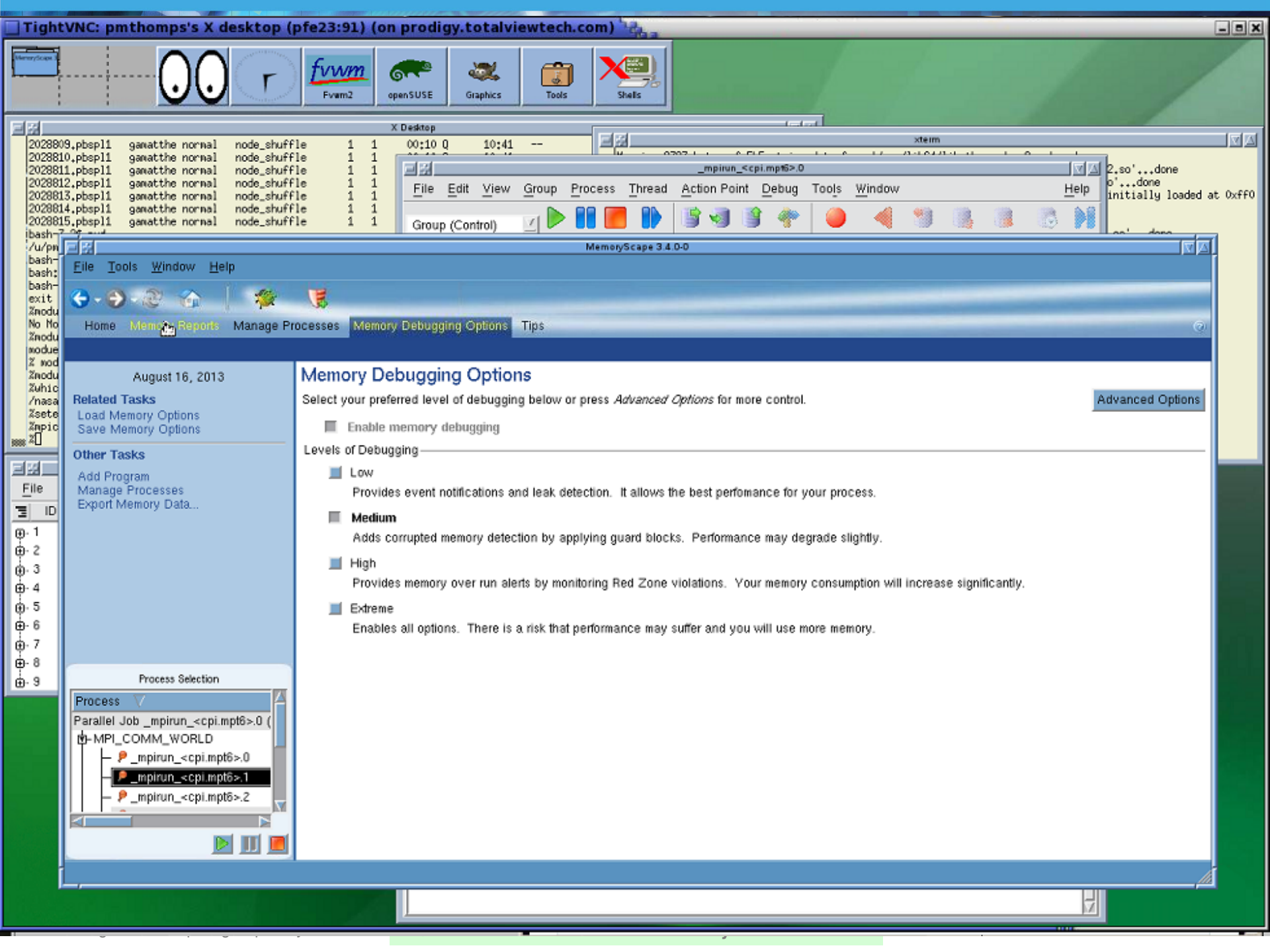
Enables all options.
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
Fvwm2
openSUSE
Graphics
Tools
Shells
X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
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2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
xterm
mpirun<cpi.mpt6>.0
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
MemoryScape 3.4.0-0
File Tools Window Help
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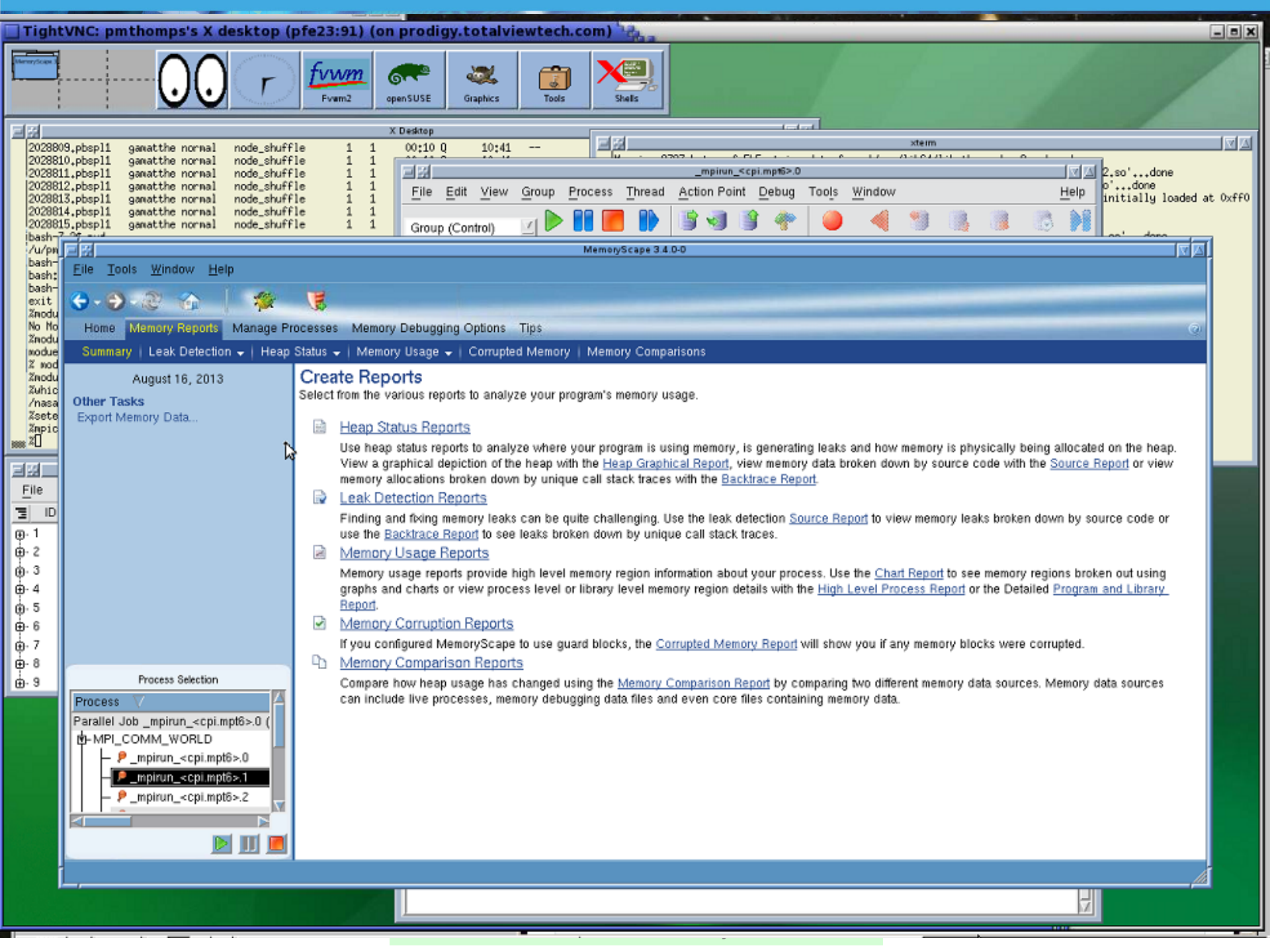
Export Memory Data...
Memory Debugging Options
Select your preferred level of debugging below or press Advanced Options for more control.
Advanced Options
Enable memory debugging
Levels of Debugging
Low
Provides event notifications and leak detection. It allows the best perfomance for your process.
Medium
Adds corrupted memory detection by applying guard blocks. Performance may degrade slightly.
High
Provides memory over run alerts by monitoring Red Zone violations. Your memory consumption will increase significantly.
Extreme
Enables all options. There is a risk that performance may suffer and you will use more memory.
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
File
ID


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
fvwm
Fvwm2
openSUSE
Graphics
Tools
Shells
X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
2028811.pbspl1 gamatthe normal node_shuffle 1 1
2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
xterm
mpirun<cpi.mpt6>.0
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
MemoryScape 3.4.0-0
File Tools Window Help
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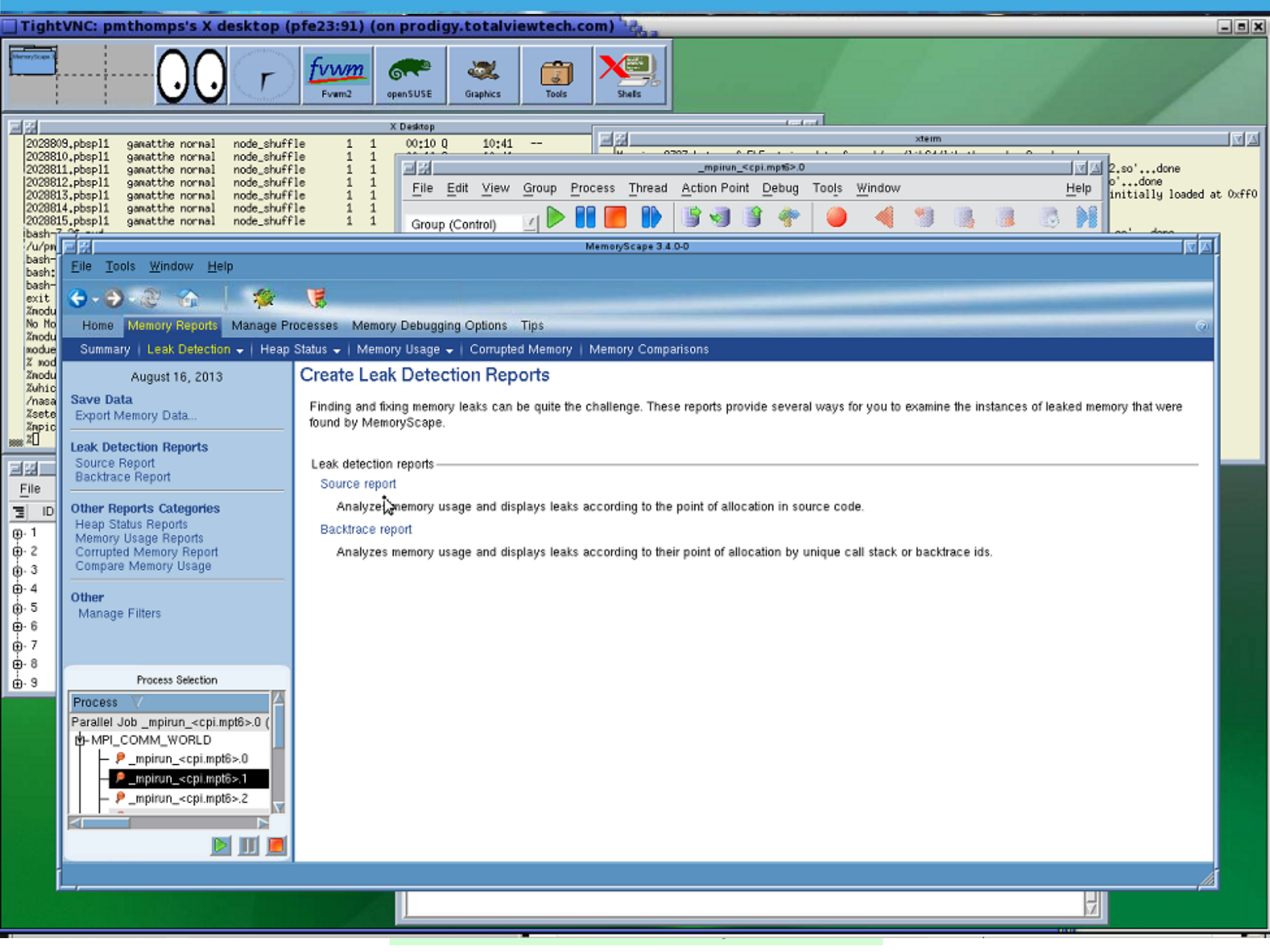
Other Tasks
Export Memory Data...
Create Reports
Select from the various reports to analyze your program's memory usage.
Heap Status Reports
Use heap status reports to analyze where your program is using memory, is generating leaks and how memory is physically being allocated on the heap. View a graphical depiction of the heap with the Heap Graphical Report, view memory data broken down by source code with the Source Report or view memory allocations broken down by unique call stack traces with the Backtrace Report.
Leak Detection Reports
Finding and fixing memory leaks can be quite challenging. Use the leak detection Source Report to view memory leaks broken down by source code or use the Backtrace Report to see leaks broken down by unique call stack traces.
Memory Usage Reports
Memory usage reports provide high level memory region information about your process. Use the Chart Report to see memory regions broken out using graphs and charts or view process level or library level memory region details with the High Level Process Report or the Detailed Program and Library Report.
Memory Corruption Reports
If you configured MemoryScape to use guard blocks, the Corrupted Memory Report will show you if any memory blocks were corrupted.
Memory Comparison Reports
Compare how heap usage has changed using the Memory Comparison Report by comparing two different memory data sources. Memory data sources can include live processes, memory debugging data files and even core files containing memory data.
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
File
ID


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
fvwm
Fvwm2
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Graphics
Tools
Shells
X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
2028811.pbspl1 gamatthe normal node_shuffle 1 1
2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
xterm
mpirun<cpi.mpt6>.0
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
MemoryScape 3.4.0-0
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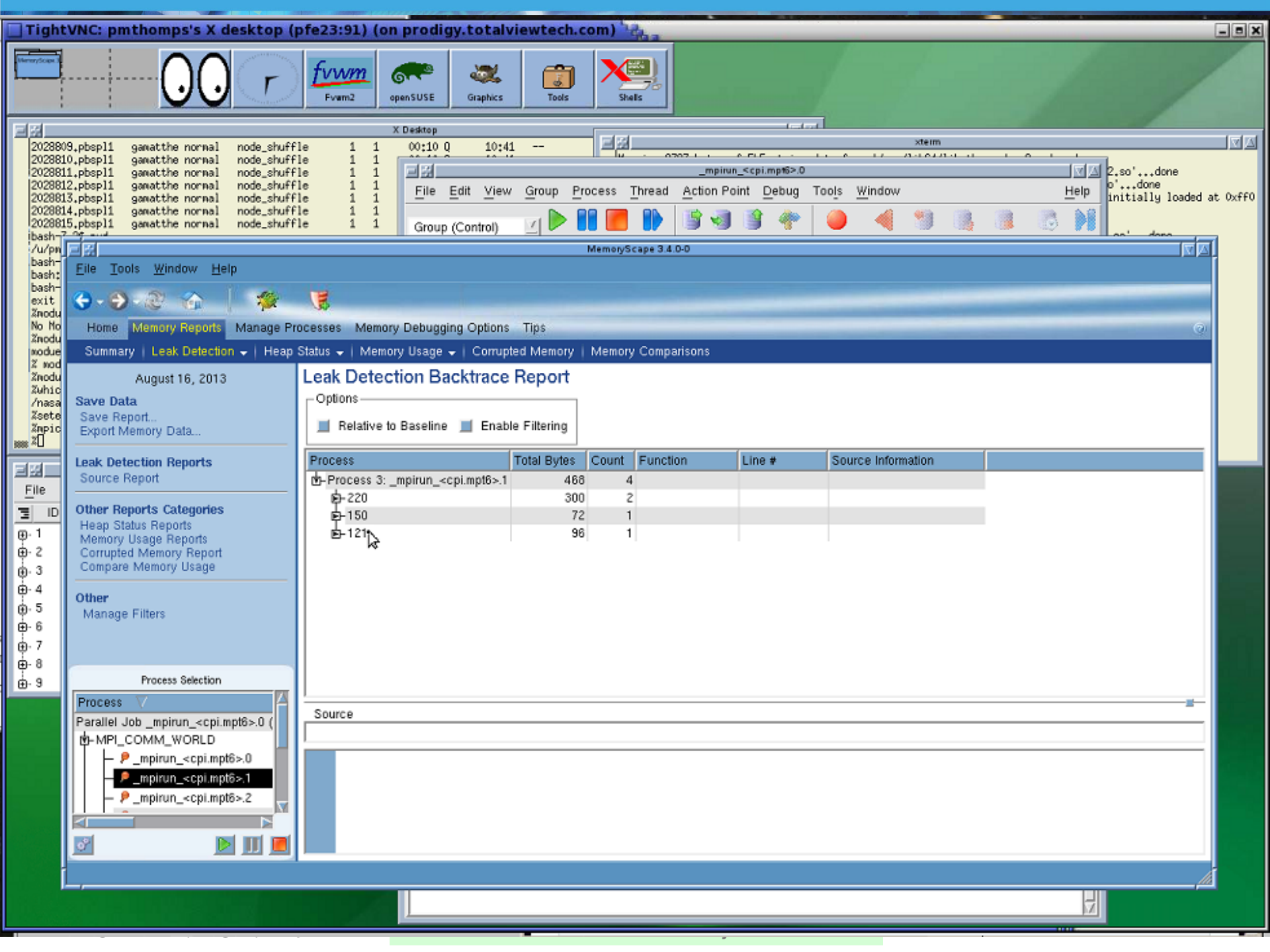
Leak Detection Reports
Source Report
Backtrace Report
Other Reports Categories
Heap Status Reports
Memory Usage Reports
Corrupted Memory Report
Compare Memory Usage
Other
Manage Filters
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
Create Leak Detection Reports
Finding and fixing memory leaks can be quite the challenge. These reports provide several ways for you to examine the instances of leaked memory that were found by MemoryScape.
Leak detection reports
Source report
Analyzes memory usage and displays leaks according to the point of allocation in source code.
Backtrace report
Analyzes memory usage and displays leaks according to their point of allocation by unique call stack or backtrace ids.


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
fvwm
Fvwm2
openSUSE
Graphics
Tools
Shells
X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
2028811.pbspl1 gamatthe normal node_shuffle 1 1
2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
xterm
mpirun<cpi.mpt6>.0
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
MemoryScape 3.4.0-0
File Tools Window Help
Home Memory Reports Manage Processes Memory Debugging Options Tips
Summary | Leak Detection | Heap Status | Memory Usage | Corrupted Memory | Memory Comparisons
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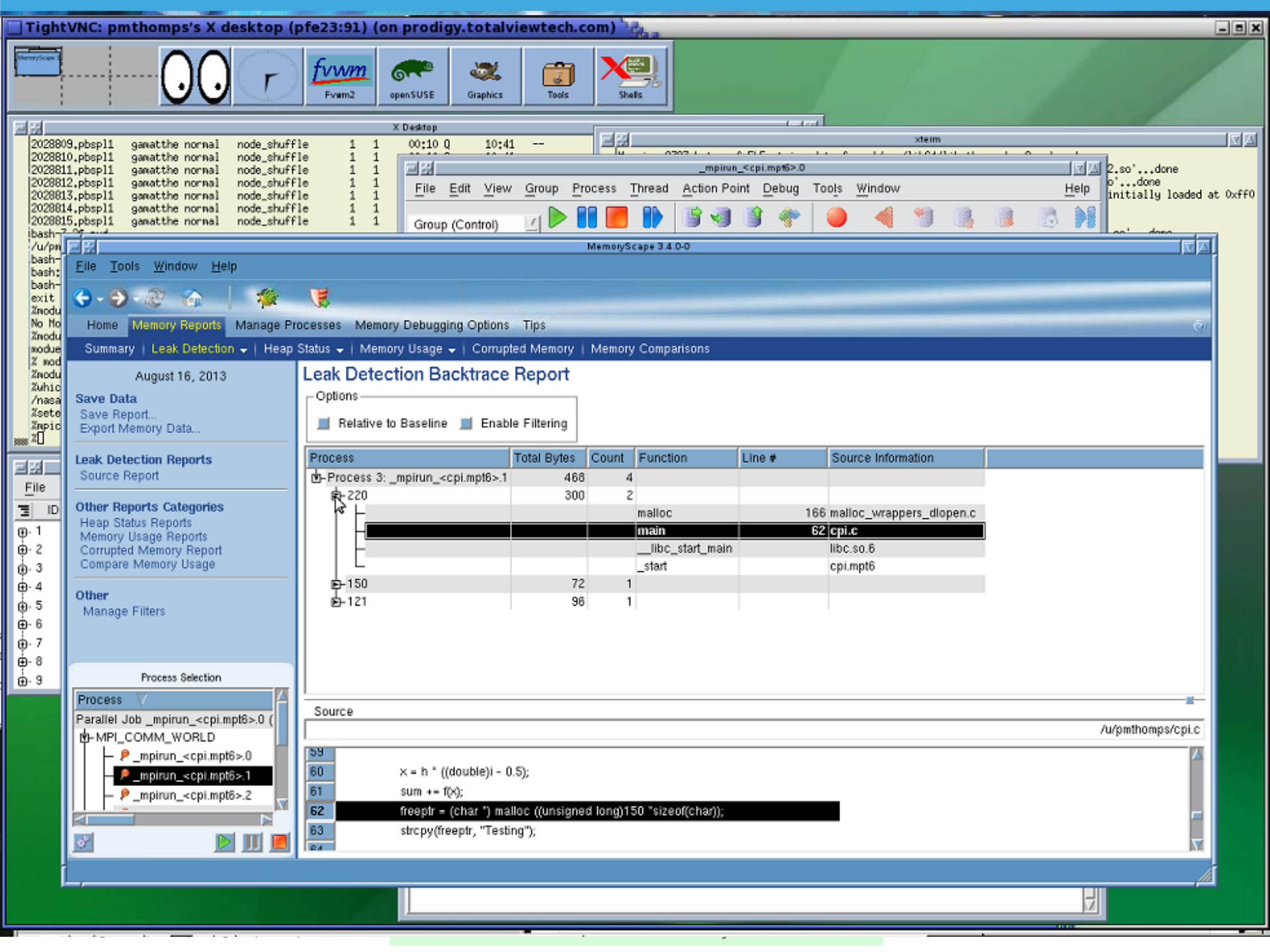
Save Data
Save Report...
Export Memory Data...
Leak Detection Reports
Source Report
Other Reports Categories
Heap Status Reports
Memory Usage Reports
Corrupted Memory Report
Compare Memory Usage
Other
Manage Filters
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
Leak Detection Backtrace Report
Options
Relative to Baseline
Enable Filtering
Process
Total Bytes
Count
Function
Line #
Source Information
Process 3: _mpirun_<cpi.mpt6>.1
468
4
220
300
2
150
72
1
121
96
1
Source


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
Fvwm2
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X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
2028811.pbspl1 gamatthe normal node_shuffle 1 1
2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
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2028815.pbspl1 gamatthe normal node_shuffle 1 1
xterm
mpirun<cpi.mpt6>.0
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
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File Tools Window Help
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Export Memory Data...
Leak Detection Reports
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Other Reports Categories
Heap Status Reports
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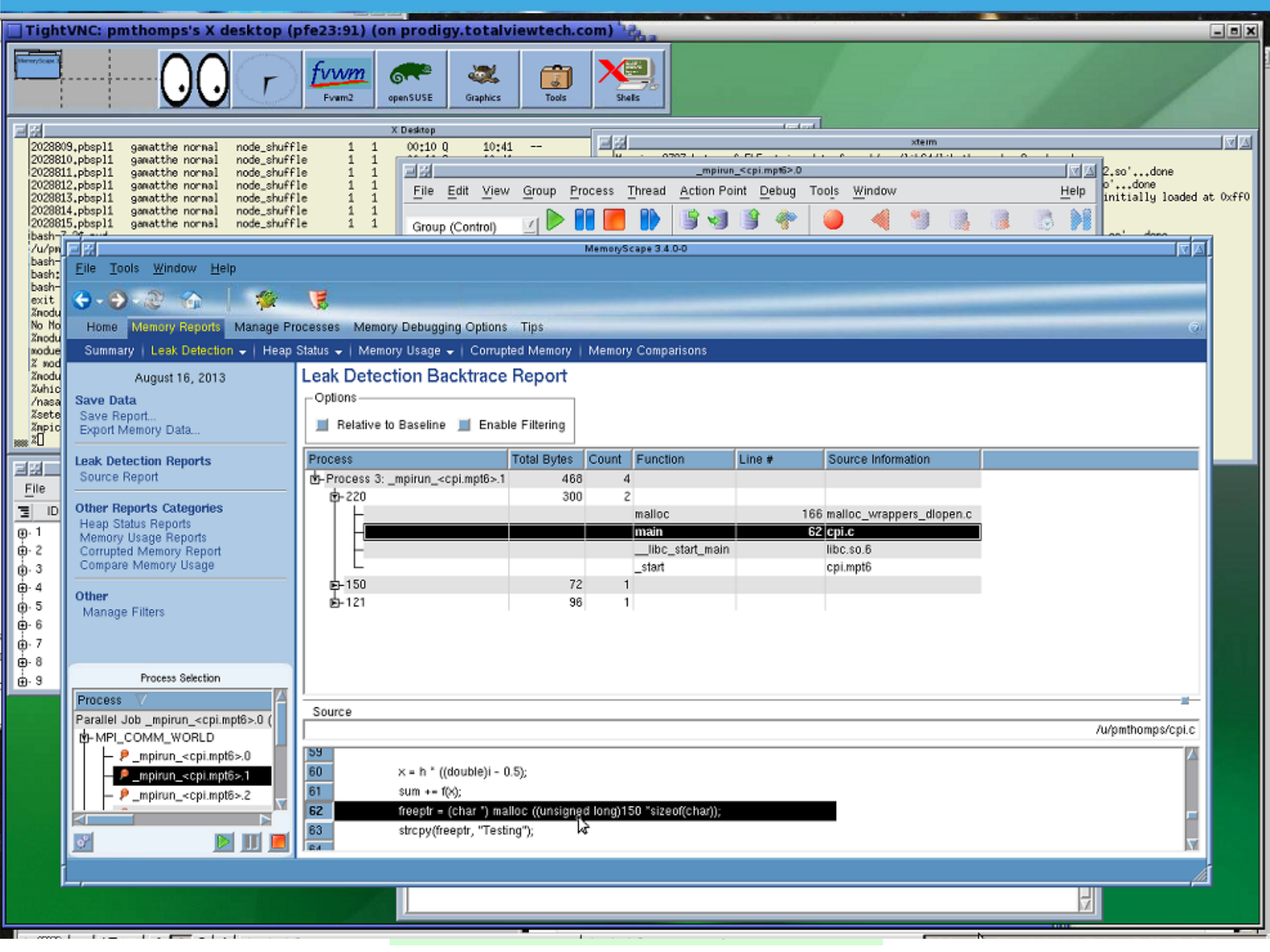
Corrupted Memory Report
Compare Memory Usage
Other
Manage Filters
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
Leak Detection Backtrace Report
Options
Relative to Baseline
Enable Filtering
Process
Total Bytes
Count
Function
Line #
Source Information
Process 3: _mpirun_<cpi.mpt6>.1 468 4
220 300 2
malloc 166 malloc_wrappers_dlopen.c
main 62 cpi.c
__libc_start_main libc.so.6
_start cpi.mpt6
150 72 1
121 96 1
Source
/u/pmthomps/cpi.c
60 x = h * ((double)i - 0.5);
61 sum += f(x);
62 freeptr = (char *) malloc ((unsigned long)150 *sizeof(char));
63 strcpy(freeptr, "Testing");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2028812.pbspl1 gamatthe normal node_shuffle 1 1
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2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
xterm
mpirun<cpi.mpt6>.0
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Group (Control)
MemoryScape 3.4.0-0
File Tools Window Help
Home Memory Reports Manage Processes Memory Debugging Options Tips
Summary | Leak Detection | Heap Status | Memory Usage | Corrupted Memory | Memory Comparisons
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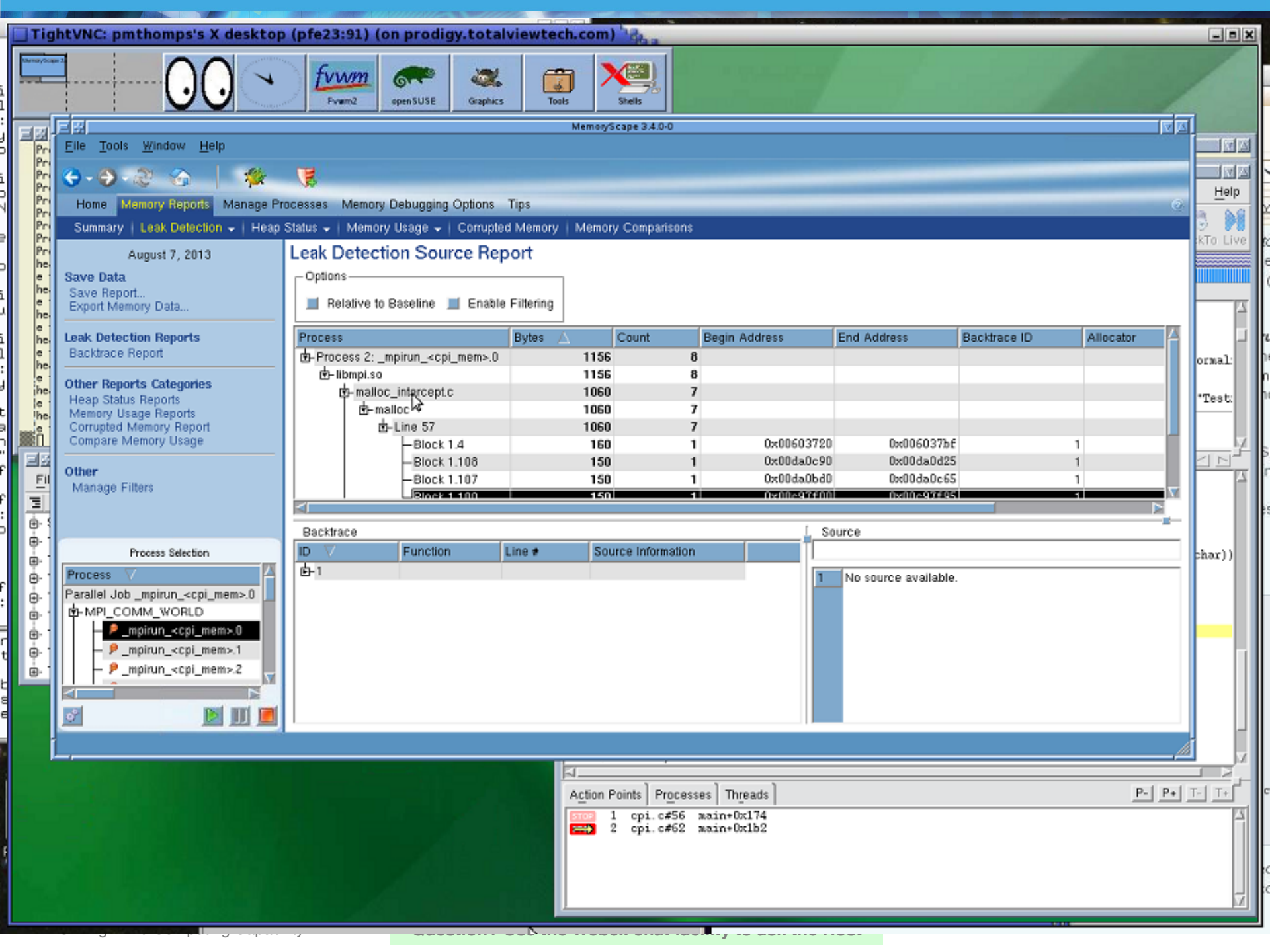
Save Data
Save Report...
Export Memory Data...
Leak Detection Reports
Source Report
Other Reports Categories
Heap Status Reports
Memory Usage Reports
Corrupted Memory Report
Compare Memory Usage
Other
Manage Filters
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
Leak Detection Backtrace Report
Options
Relative to Baseline
Enable Filtering
Process
Total Bytes
Count
Function
Line #
Source Information
Process 3: _mpirun_<cpi.mpt6>.1 468 4
220 300 2
malloc 166 malloc_wrappers_dlopen.c
main 62 cpi.c
__libc_start_main libc.so.6
_start cpi.mpt6
150 72 1
121 96 1
Source
/u/pmthomps/cpi.c
60 x = h * ((double)i - 0.5);
61 sum += f(x);
62 freeptr = (char *) malloc ((unsigned long)150 *sizeof(char));
63 strcpy(freeptr, "Testing");

Example using *mpi-sgi/mpt.2.08r7*

Question? Use the Webex chat facility to ask the Host


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
fvwm
Fvwm2
openSUSE
Graphics
Tools
Shells
MemoryScape 3.4.0-0
File Tools Window Help
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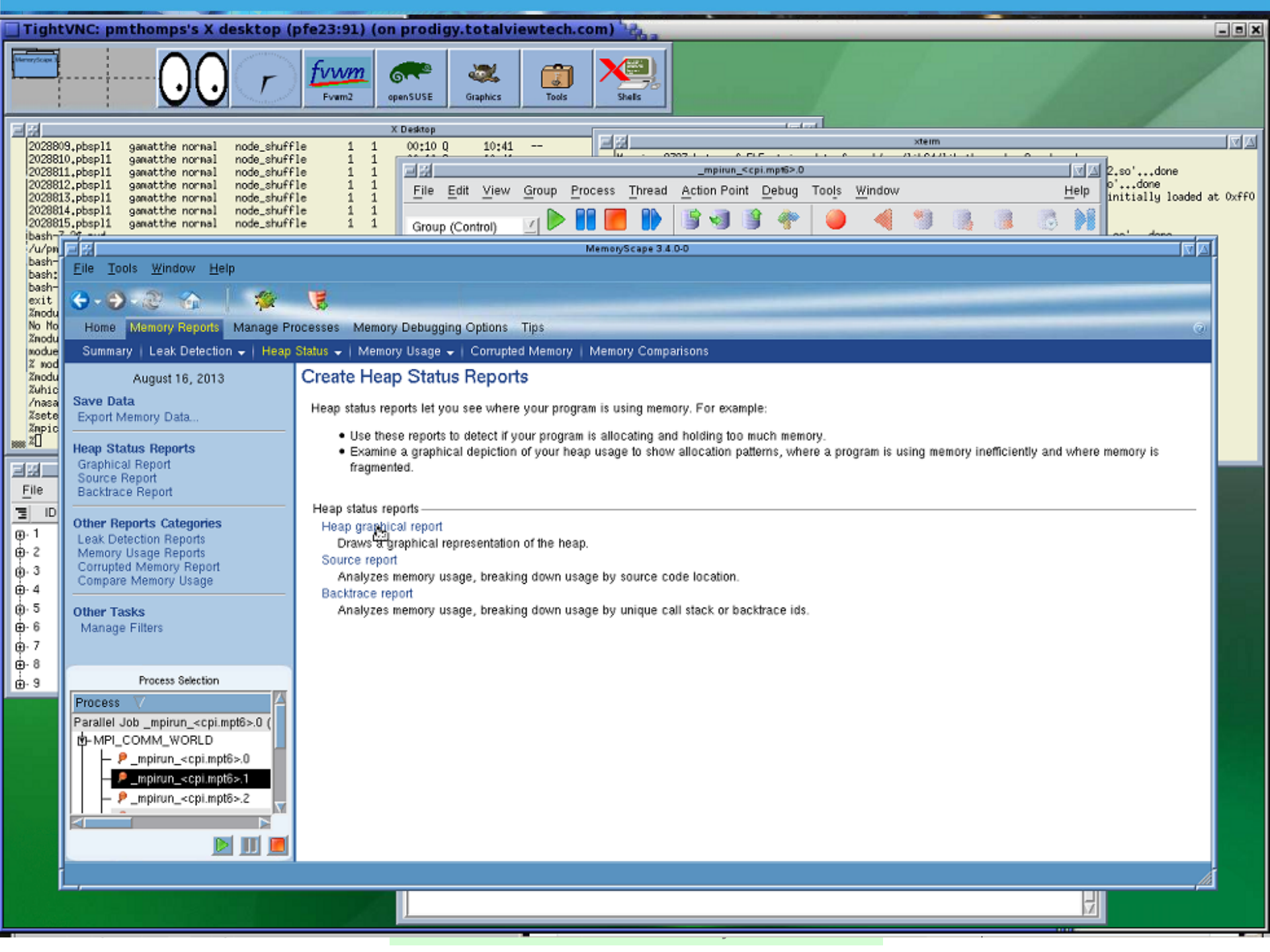
Leak Detection Reports
Backtrace Report
Other Reports Categories
Heap Status Reports
Memory Usage Reports
Corrupted Memory Report
Compare Memory Usage
Other
Manage Filters
Leak Detection Source Report
Options
Relative to Baseline
Enable Filtering
Process
Bytes
Count
Begin Address
End Address
Backtrace ID
Allocator
Process 2: _mpirun_<cpi_mem>.0 1156 8
libmpi.so 1156 8
malloc_intercept.c 1060 7
malloc 1060 7
Line 57 1060 7
Block 1.4 160 1 0x00603720 0x006037bf 1
Block 1.108 150 1 0x00da0c90 0x00da0d25 1
Block 1.107 150 1 0x00da0bd0 0x00da0c65 1
Backtrace
ID
Function
Line #
Source Information
1
Source
No source available.
Process Selection
Process
Parallel Job _mpirun_<cpi_mem>.0
MPI_COMM_WORLD
mpirun<cpi_mem>.0
mpirun<cpi_mem>.1
mpirun<cpi_mem>.2
Action Points
Processes
Threads
STOP 1 cpi.c#56 main+0x174
2 cpi.c#62 main+0x1b2

Going back to Example using *mpi-sgi/mpt.2.06r6*

Question? Use the Webex chat facility to ask the Host


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
fvwm
Fvwm2
openSUSE
Graphics
Tools
Shells
X Desktop
2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
2028811.pbspl1 gamatthe normal node_shuffle 1 1
2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
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mpirun<cpi.mpt6>.0
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Group (Control)
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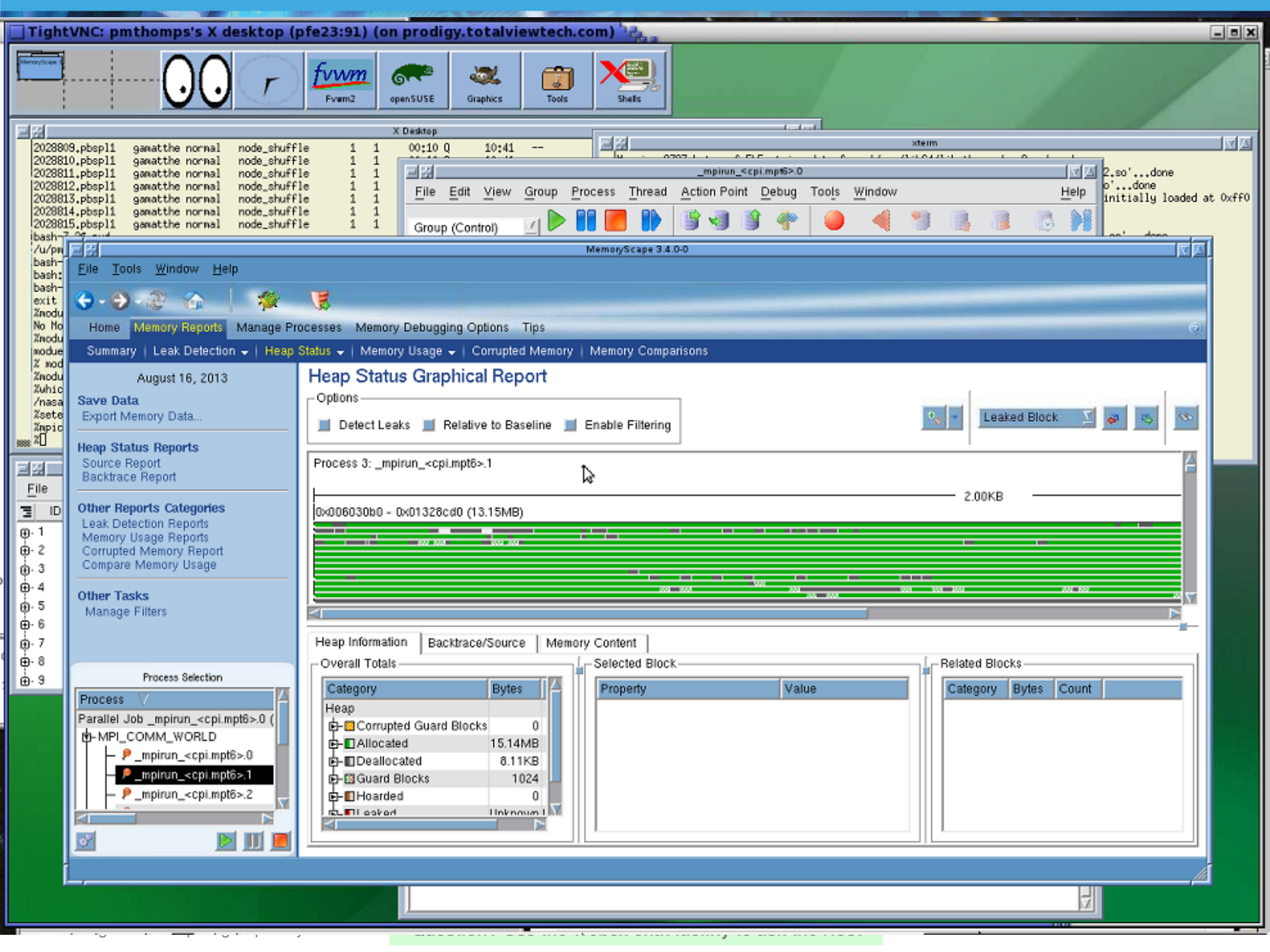
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
Create Heap Status Reports
Heap status reports let you see where your program is using memory. For example:
Use these reports to detect if your program is allocating and holding too much memory.
Examine a graphical depiction of your heap usage to show allocation patterns, where a program is using memory inefficiently and where memory is fragmented.
Heap status reports
Heap graphical report
Draws a graphical representation of the heap.
Source report
Analyzes memory usage, breaking down usage by source code location.
Backtrace report
Analyzes memory usage, breaking down usage by unique call stack or backtrace ids.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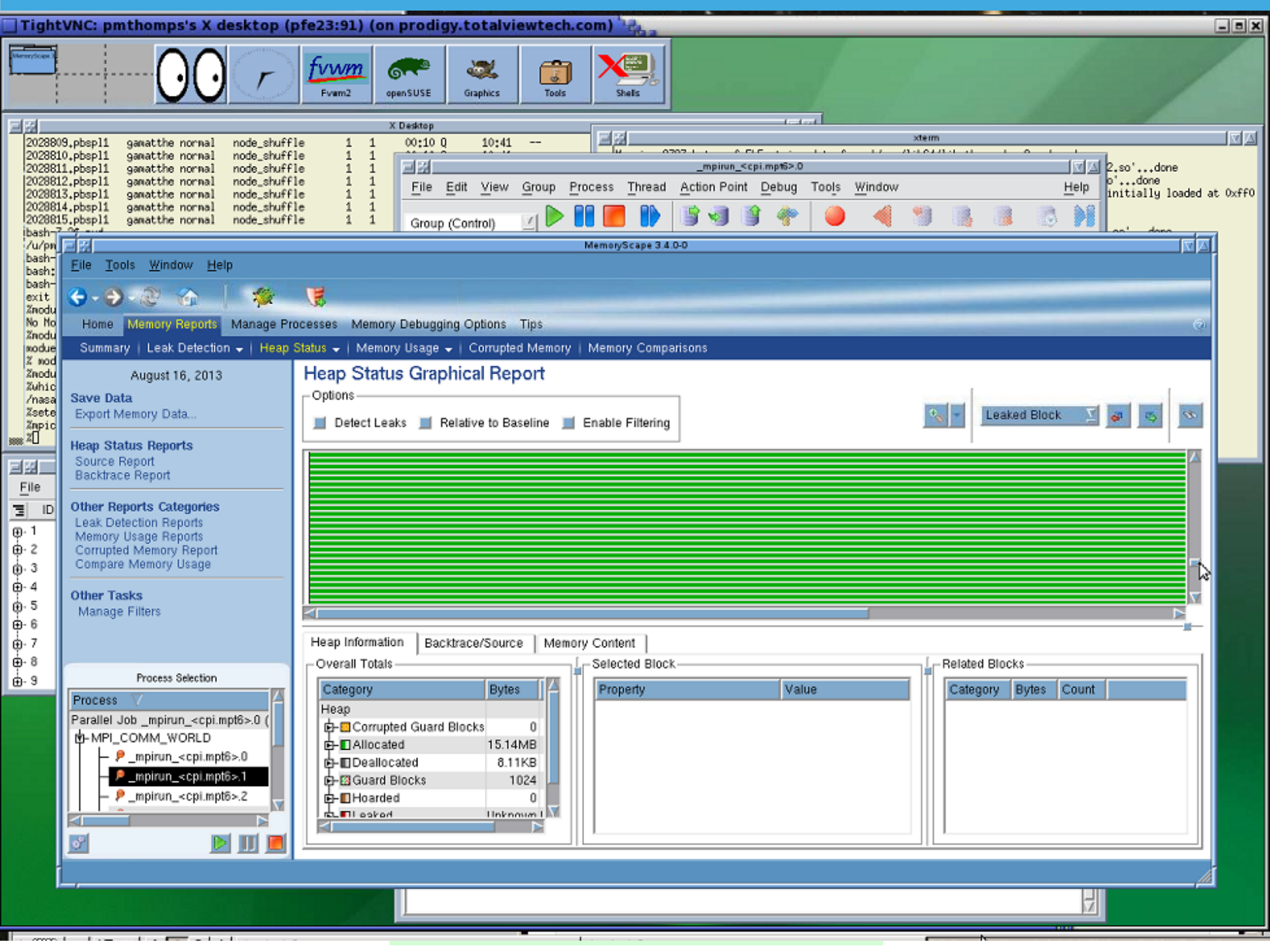
Compare Memory Usage
Other Tasks
Manage Filters
Heap Status Graphical Report
Options
Detect Leaks
Relative to Baseline
Enable Filtering
Leaked Block
Process 3: _mpirun_<cpi.mpt6>.1
2.00KB
0x006030b0 - 0x01328cd0 (13.15MB)
Heap Information
Backtrace/Source
Memory Content
Overall Totals
Category Bytes
Heap
Corrupted Guard Blocks 0
Allocated 15.14MB
Deallocated 8.11KB
Guard Blocks 1024
Hoarded 0
Selected Block
Property Value
Related Blocks
Category Bytes Count
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2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mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
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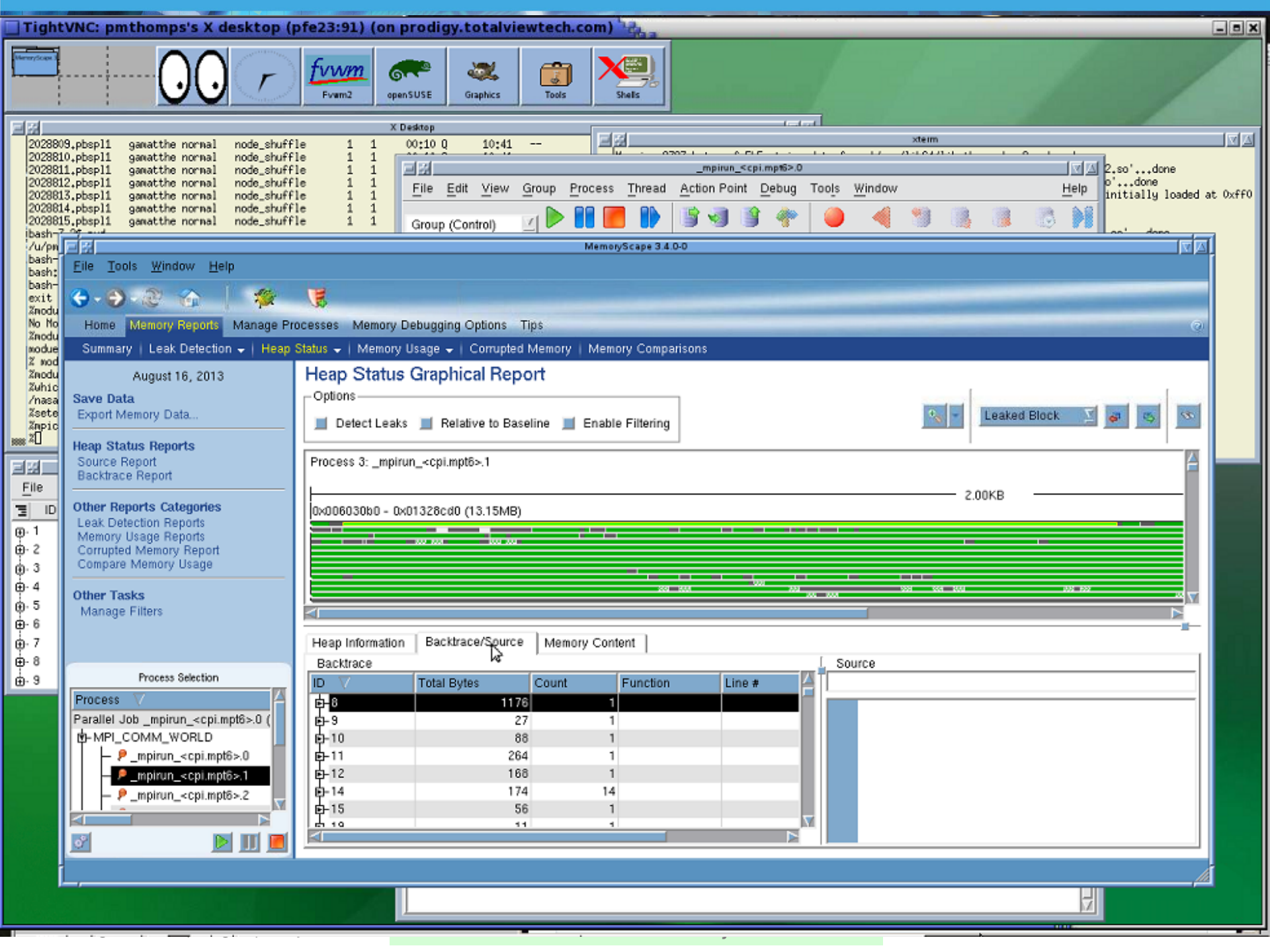
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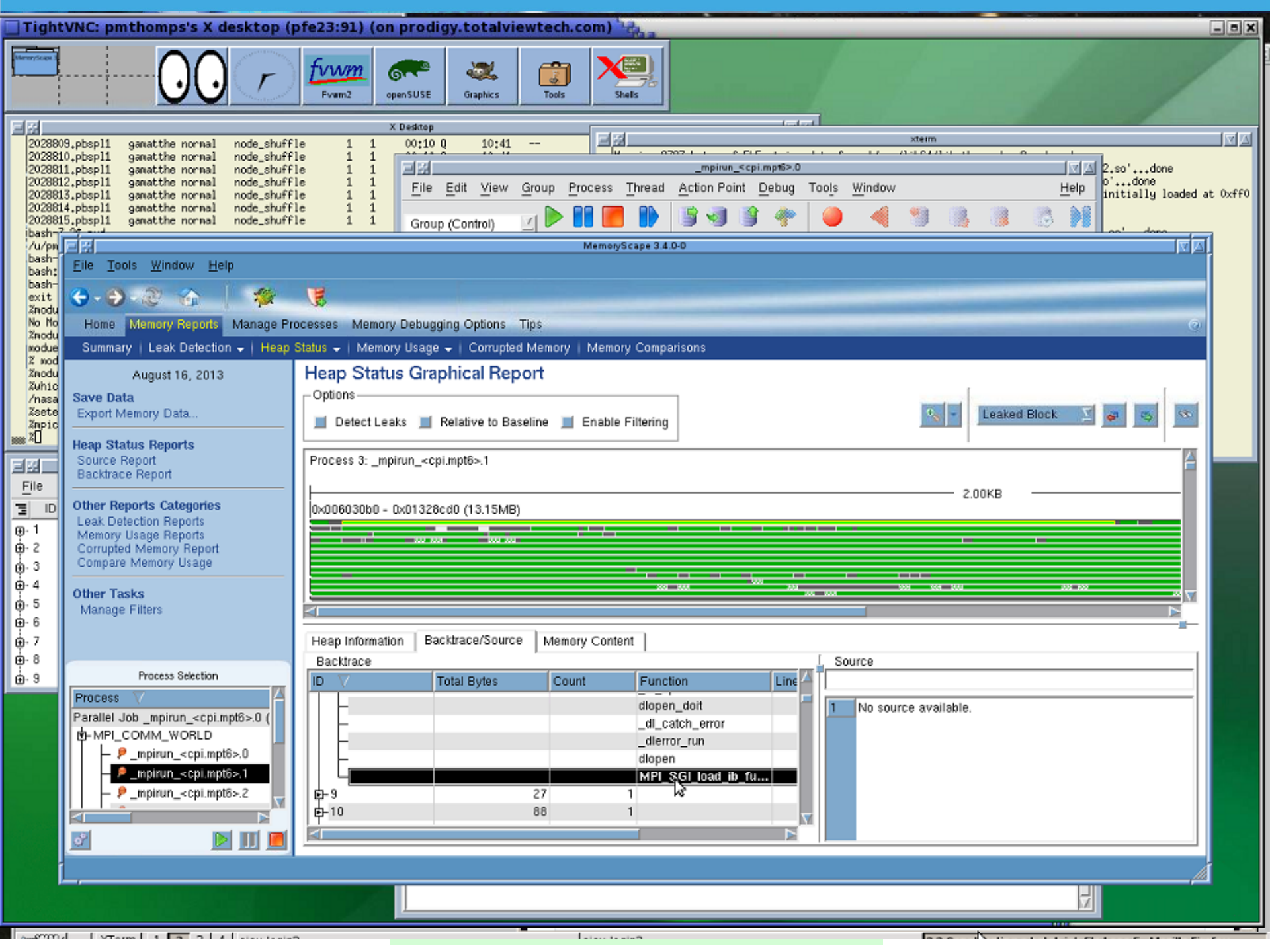
Leaked Block
Process 3: _mpirun_<cpi.mpt6>.1
2.00KB
0x006030b0 - 0x01328cd0 (13.15MB)
Heap Information
Backtrace/Source
Memory Content
Backtrace
Source
ID Total Bytes Count Function Line #
8 1176 1
9 27 1
10 88 1
11 264 1
12 168 1
14 174 14
15 56 1
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2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Other Tasks
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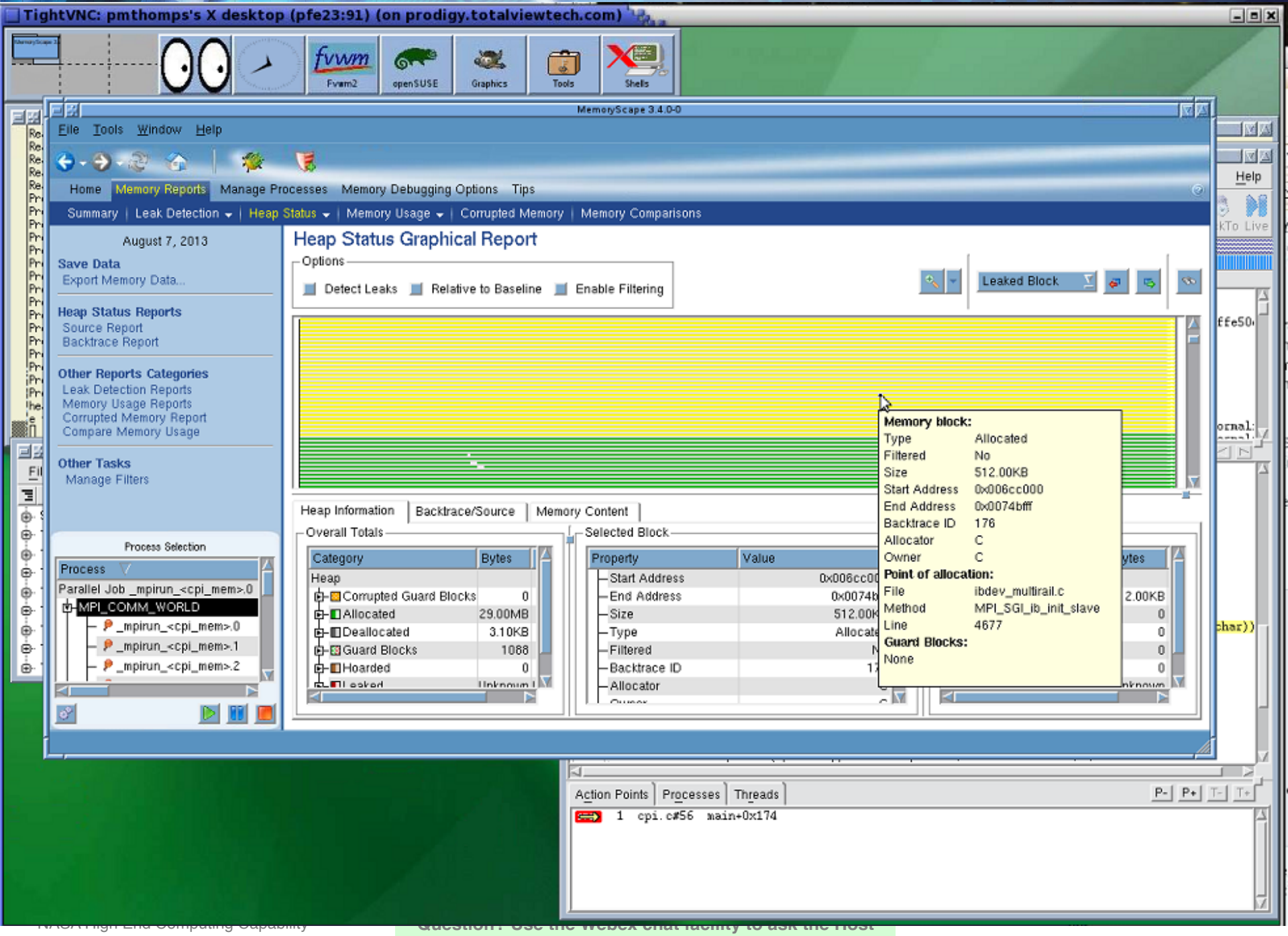
Heap Status Graphical Report
Options
Detect Leaks
Relative to Baseline
Enable Filtering
Leaked Block
Process 3: _mpirun_<cpi.mpt6>.1
2.00KB
0x006030b0 - 0x01328cd0 (13.15MB)
Heap Information
Backtrace/Source
Memory Content
Backtrace
ID
Total Bytes
Count
Function
dlopen_doit
_dl_catch_error
_dlerror_run
dlopen
MPI_SGI_load_ib_fu...
9 27 1
10 88 1
Source
1 No source available.
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2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Heap Status Graphical Report
Options
Detect Leaks
Relative to Baseline
Enable Filtering
Leaked Block
Memory block:
Type Allocated
Filtered No
Size 512.00KB
Start Address 0x006cc000
End Address 0x0074bfff
Backtrace ID 176
Allocator C
Owner C
Point of allocation:
File ibdev_multirail.c
Method MPI_SGI_ib_init_slave
Line 4677
Guard Blocks:
None
Heap Information
Backtrace/Source
Memory Content
Overall Totals
Category
Bytes
Heap
Corrupted Guard Blocks 0
Allocated 29.00MB
Deallocated 3.10KB
Guard Blocks 1068
Hoarded 0
Selected Block
Property
Value
Start Address
End Address
Size
Type
Filtered
Backtrace ID
Allocator
Process Selection
Process
Parallel Job _mpirun_<cpi_mem>.0
MPI_COMM_WORLD
mpirun<cpi_mem>.0
mpirun<cpi_mem>.1
mpirun<cpi_mem>.2
Action Points
Processes
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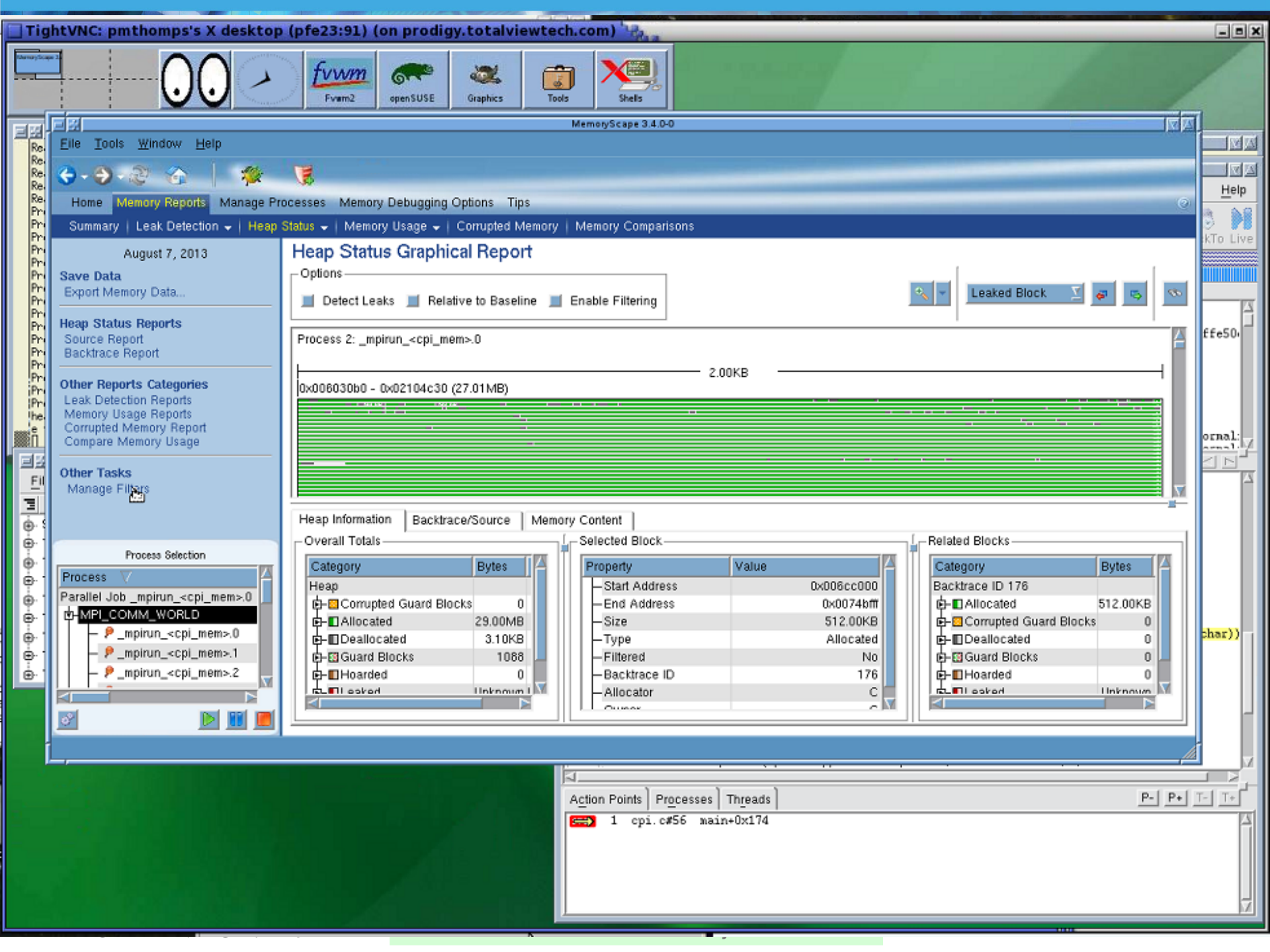
1 cpi.c#56 main+0x174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Options
Detect Leaks
Relative to Baseline
Enable Filtering
Leaked Block
Process 2: _mpirun_<cpi_mem>.0
2.00KB
0x006030b0 - 0x02104c30 (27.01MB)
Heap Information
Backtrace/Source
Memory Content
Overall Totals
Category
Bytes
Heap
Corrupted Guard Blocks 0
Allocated 29.00MB
Deallocated 3.10KB
Guard Blocks 1088
Hoarded 0
Selected Block
Property
Value
Start Address 0x006cc000
End Address 0x0074bfff
Size 512.00KB
Type Allocated
Filtered No
Backtrace ID 176
Allocator C
Related Blocks
Backtrace ID 176
Allocated 512.00KB
Corrupted Guard Blocks 0
Deallocated 0
Guard Blocks 0
Hoarded 0
Process Selection
Process
Parallel Job _mpirun_<cpi_mem>.0
MPI_COMM_WORLD
mpirun<cpi_mem>.0
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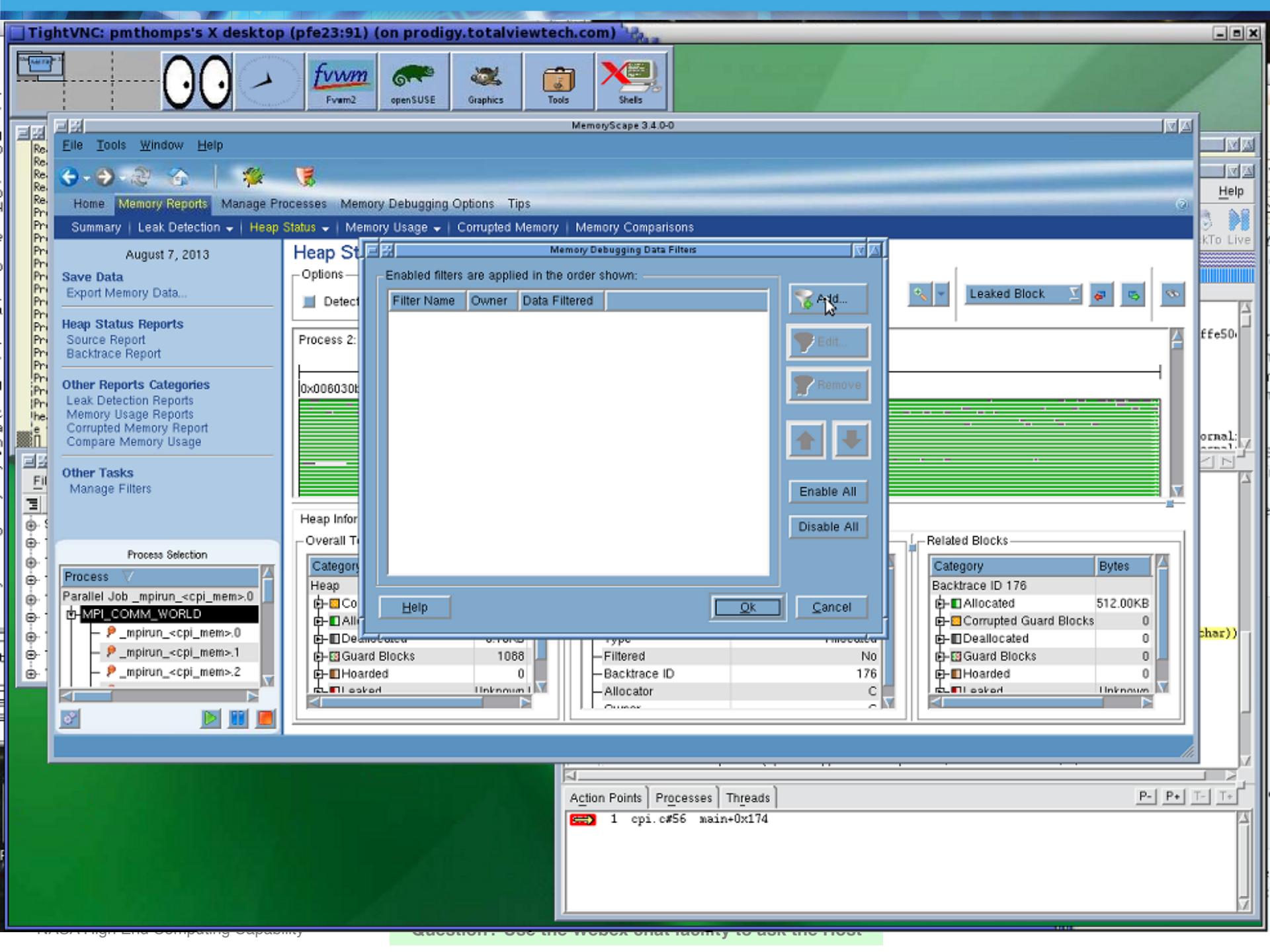
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MPI_COMM_WORLD
mpirun<cpi_mem>.0
mpirun<cpi_mem>.1
mpirun<cpi_mem>.2
Heap St
Options
Process 2:
Memory Debugging Data Filters
Enabled filters are applied in the order shown:
Filter Name
Owner
Data Filtered
Add...
Edit...
Remove
Enable All
Disable All
Help
Ok
Cancel
Leaked Block
Heap Infor
Overall T
Category
Heap
Guard Blocks 1088
Hoarded 0
Filtered No
Backtrace ID 176
Allocator C
Related Blocks
Category
Bytes
Backtrace ID 176
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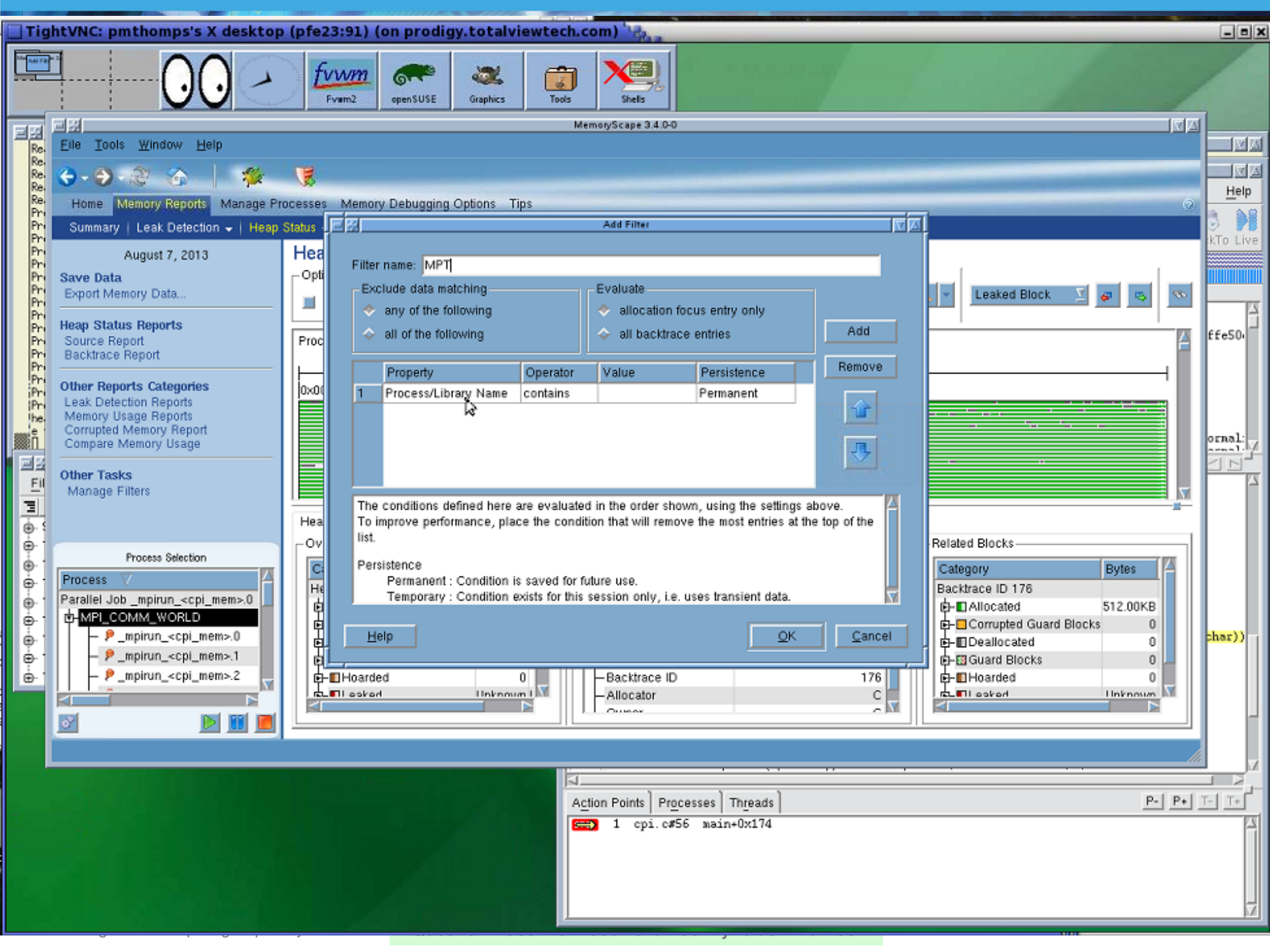
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Process
Parallel Job _mpirun_<cpi_mem>.0
MPI_COMM_WORLD
mpirun<cpi_mem>.0
mpirun<cpi_mem>.1
mpirun<cpi_mem>.2
Add Filter
Filter name: MPT
Exclude data matching
any of the following
all of the following
Evaluate
allocation focus entry only
all backtrace entries
Add
Remove
Property
Operator
Value
Persistence
1
Process/Library Name
contains
Permanent
The conditions defined here are evaluated in the order shown, using the settings above.
To improve performance, place the condition that will remove the most entries at the top of the list.
Persistence
Permanent : Condition is saved for future use.
Temporary : Condition exists for this session only, i.e. uses transient data.
Help
OK
Cancel
Leaked Block
Related Blocks
Category
Bytes
Backtrace ID 176
Allocated
512.00KB
Corrupted Guard Blocks
0
Deallocated
0
Guard Blocks
0
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0
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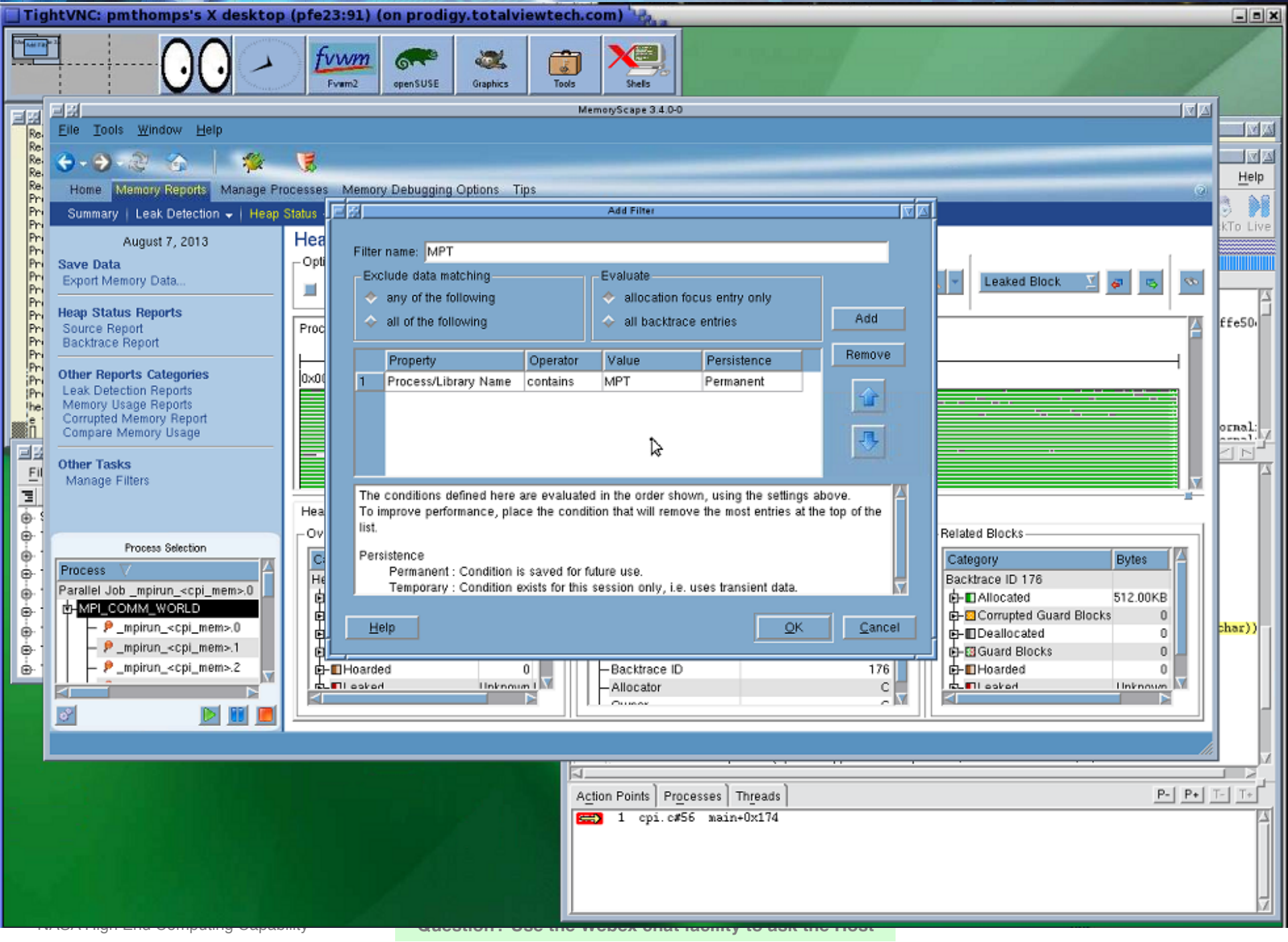
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mpirun<cpi_mem>.1
mpirun<cpi_mem>.2
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all of the following
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OK
Cancel
Leaked Block
Related Blocks
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Backtrace ID 176
Allocated
512.00KB
Corrupted Guard Blocks
0
Deallocated
0
Guard Blocks
0
Hoarded
0
Backtrace ID
176
Allocator
C
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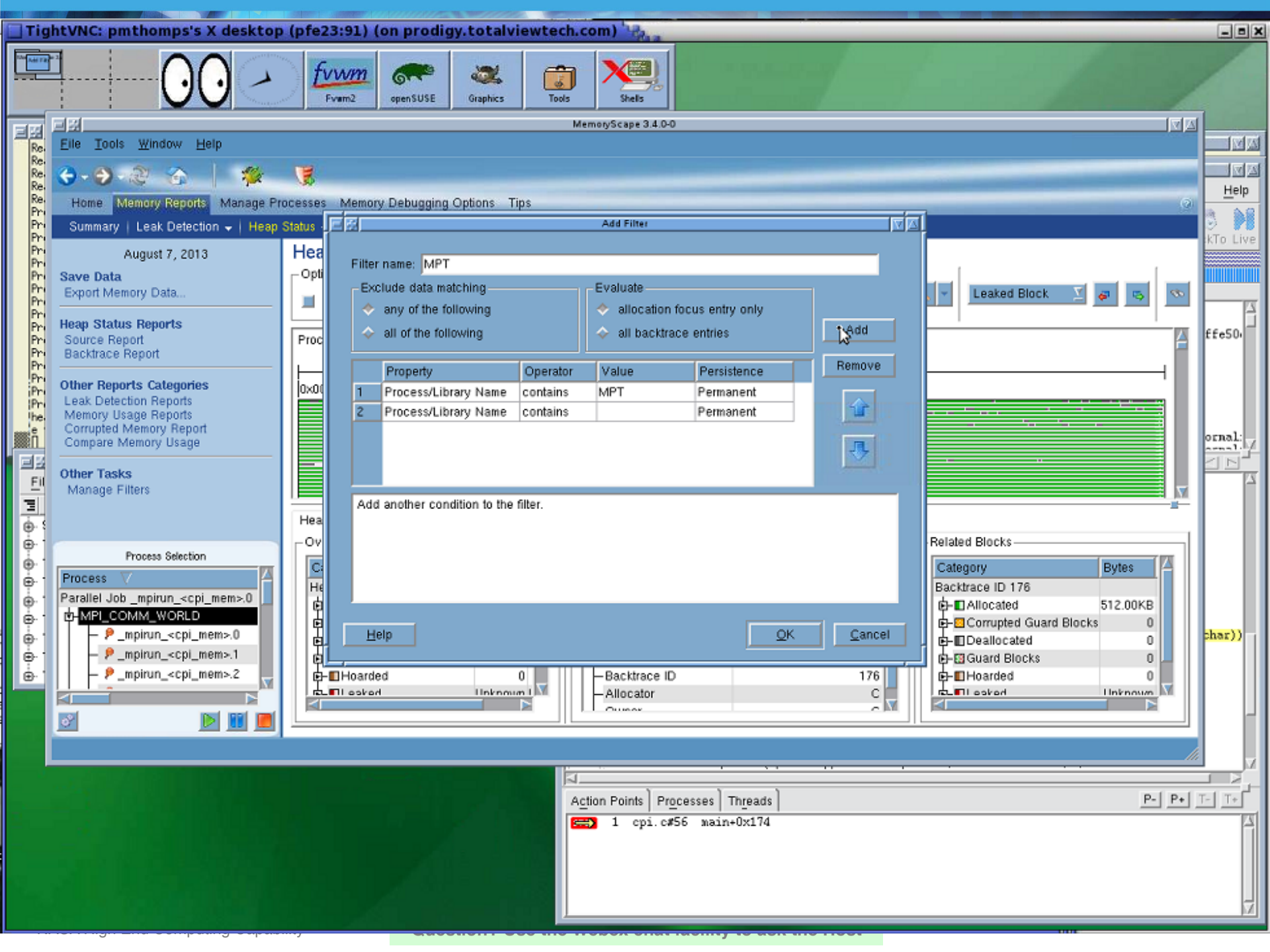
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Parallel Job _mpirun_<cpi_mem>.0
MPI_COMM_WORLD
mpirun<cpi_mem>.0
mpirun<cpi_mem>.1
mpirun<cpi_mem>.2
Add Filter
Filter name: MPT
Exclude data matching
any of the following
all of the following
Evaluate
allocation focus entry only
all backtrace entries
Add
Remove
Property Operator Value Persistence
1 Process/Library Name contains MPT Permanent
2 Process/Library Name contains Permanent
Add another condition to the filter.
Help
OK
Cancel
Leaked Block
Related Blocks
Category Bytes
Backtrace ID 176
Allocated 512.00KB
Corrupted Guard Blocks 0
Deallocated 0
Guard Blocks 0
Hoarded 0
Backtrace ID 176
Allocator C
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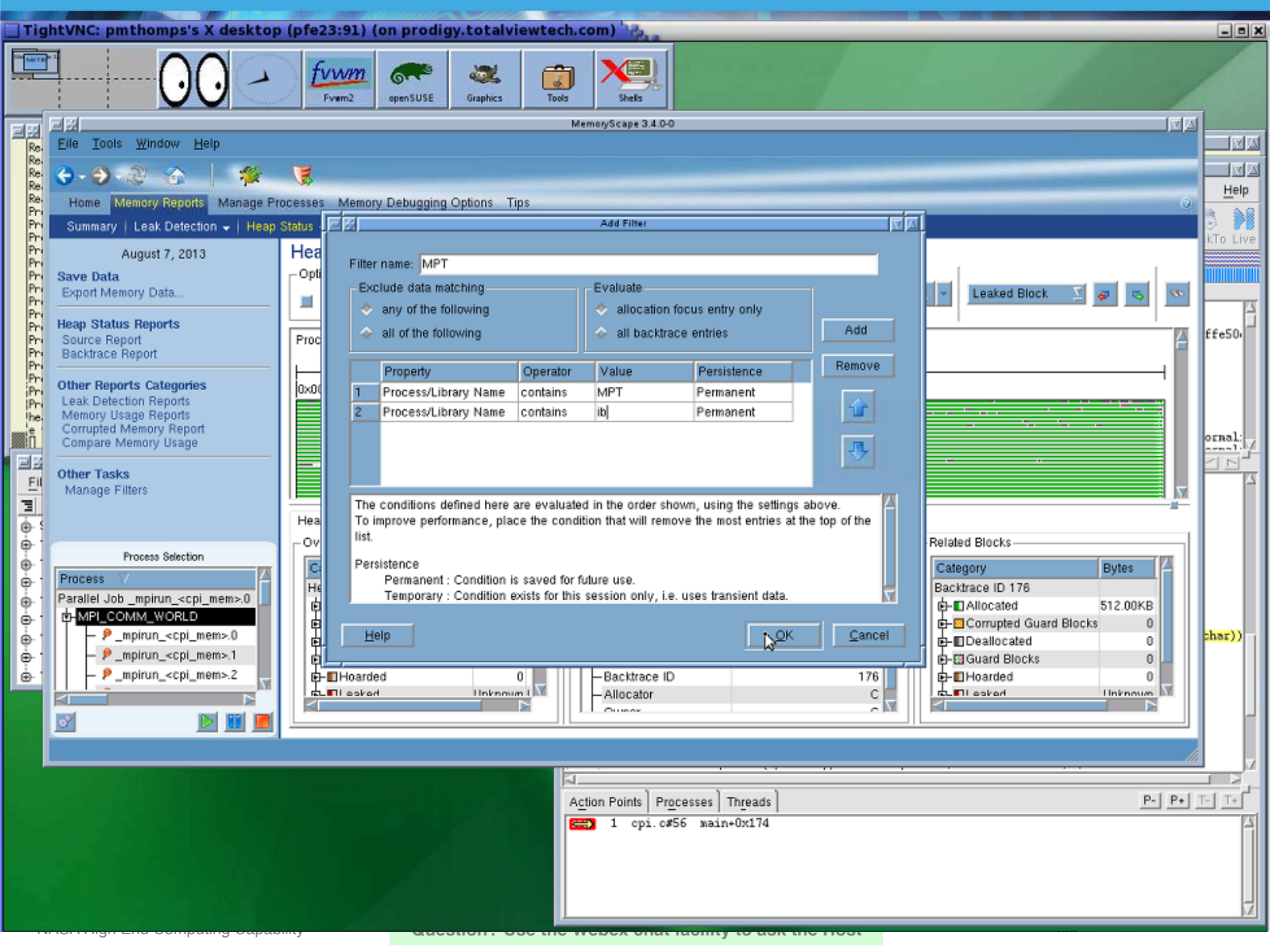
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Add
Remove
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1 Process/Library Name contains MPT Permanent
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Leaked Block
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Backtrace ID 176
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Deallocated 0
Guard Blocks 0
Hoarded 0
Backtrace ID 176
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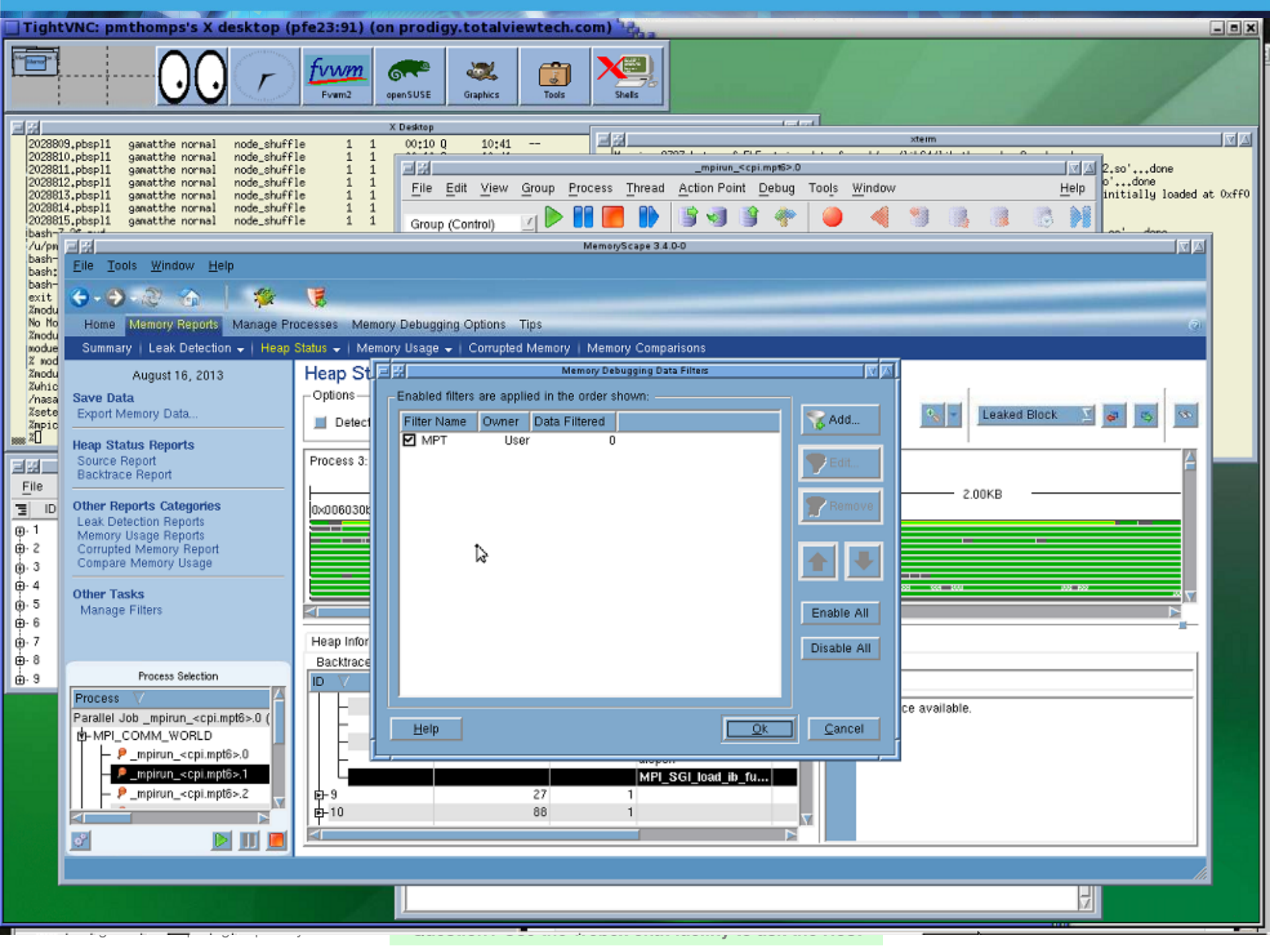
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2028810.pbspl1 gamatthe normal node_shuffle 1 1
2028811.pbspl1 gamatthe normal node_shuffle 1 1
2028812.pbspl1 gamatthe normal node_shuffle 1 1
2028813.pbspl1 gamatthe normal node_shuffle 1 1
2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
xterm
mpirun<cpi.mpt6>.0
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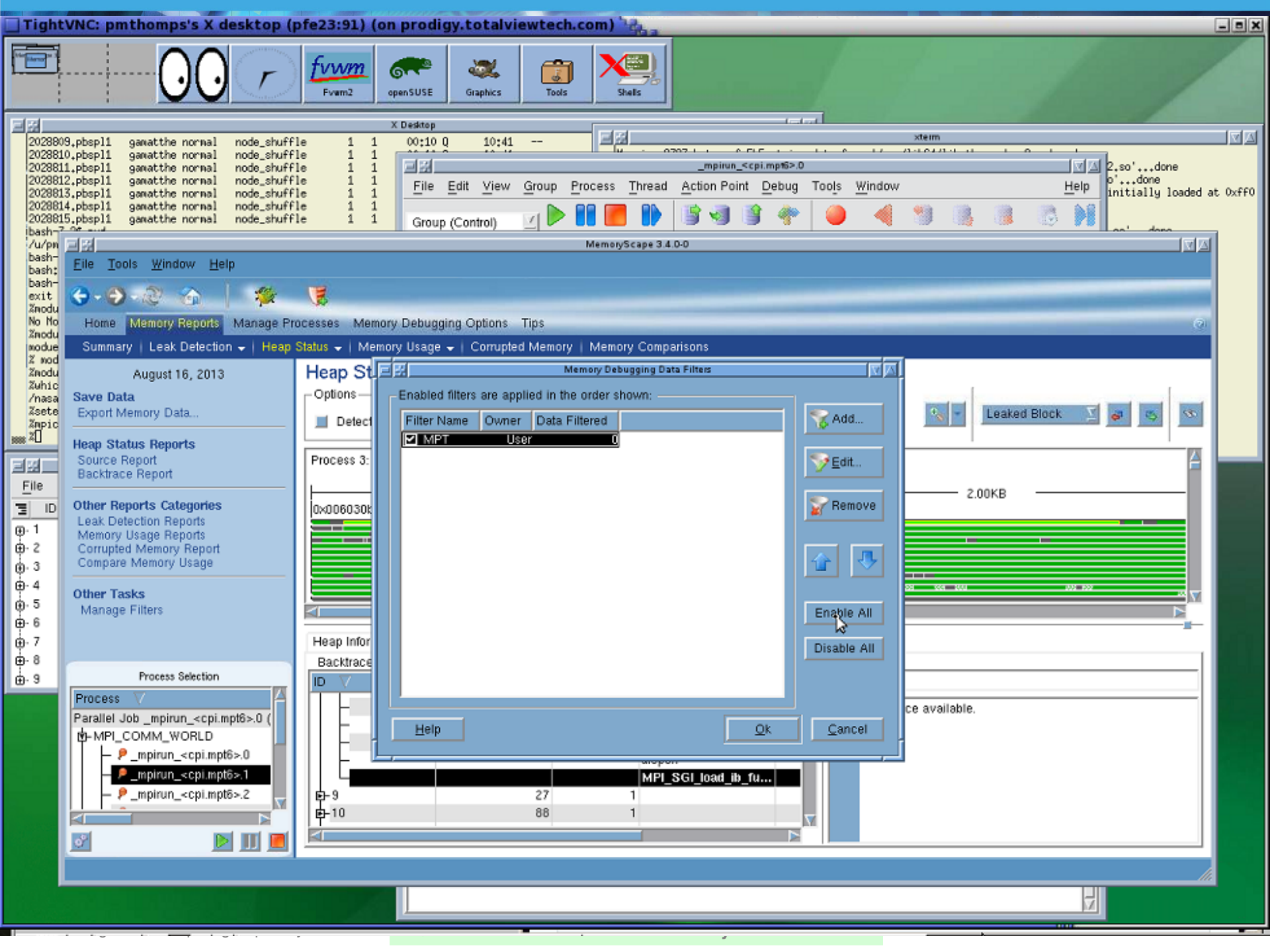
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2
Memory Debugging Data Filters
Enabled filters are applied in the order shown:
Filter Name Owner Data Filtered
MPT User 0
Add...
Edit...
Remove
Enable All
Disable All
Help
Ok
Cancel
Leaked Block
2.00KB
MPI_SGI_load_ib_fu...
9 27 1
10 88 1


TightVNC: pmthomps's X desktop (pfe23:91) (on prodigy.totalviewtech.com)
fvwm
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Graphics
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X Desktop
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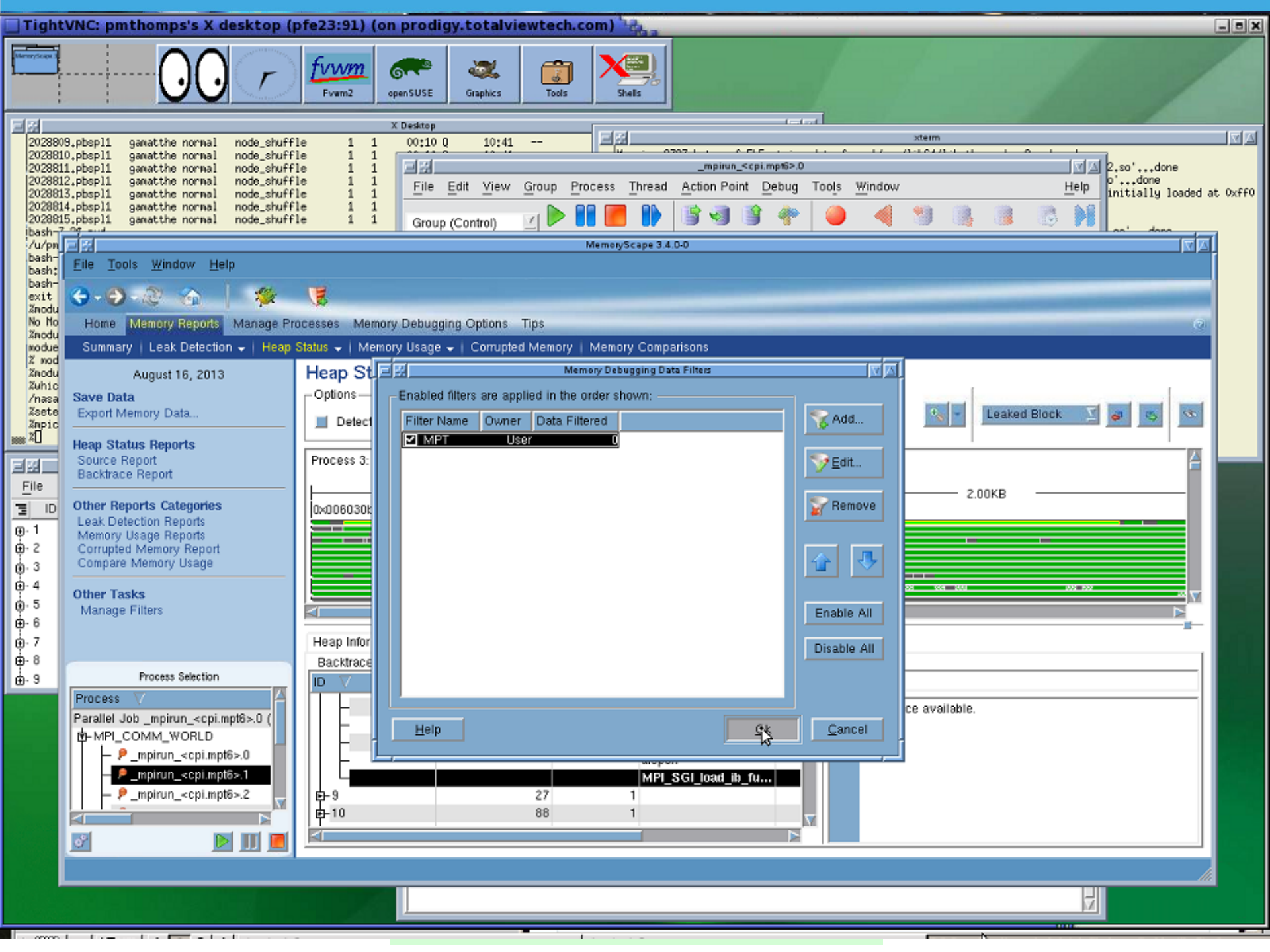
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2028809.pbspl1 gamatthe normal node_shuffle 1 1 00:10 Q 10:41 --
2028810.pbspl1 gamatthe normal node_shuffle 1 1
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2028814.pbspl1 gamatthe normal node_shuffle 1 1
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Edit...
Remove
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Disable All
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2.00KB
MPI_SGI_load_ib_fu...
9 27 1
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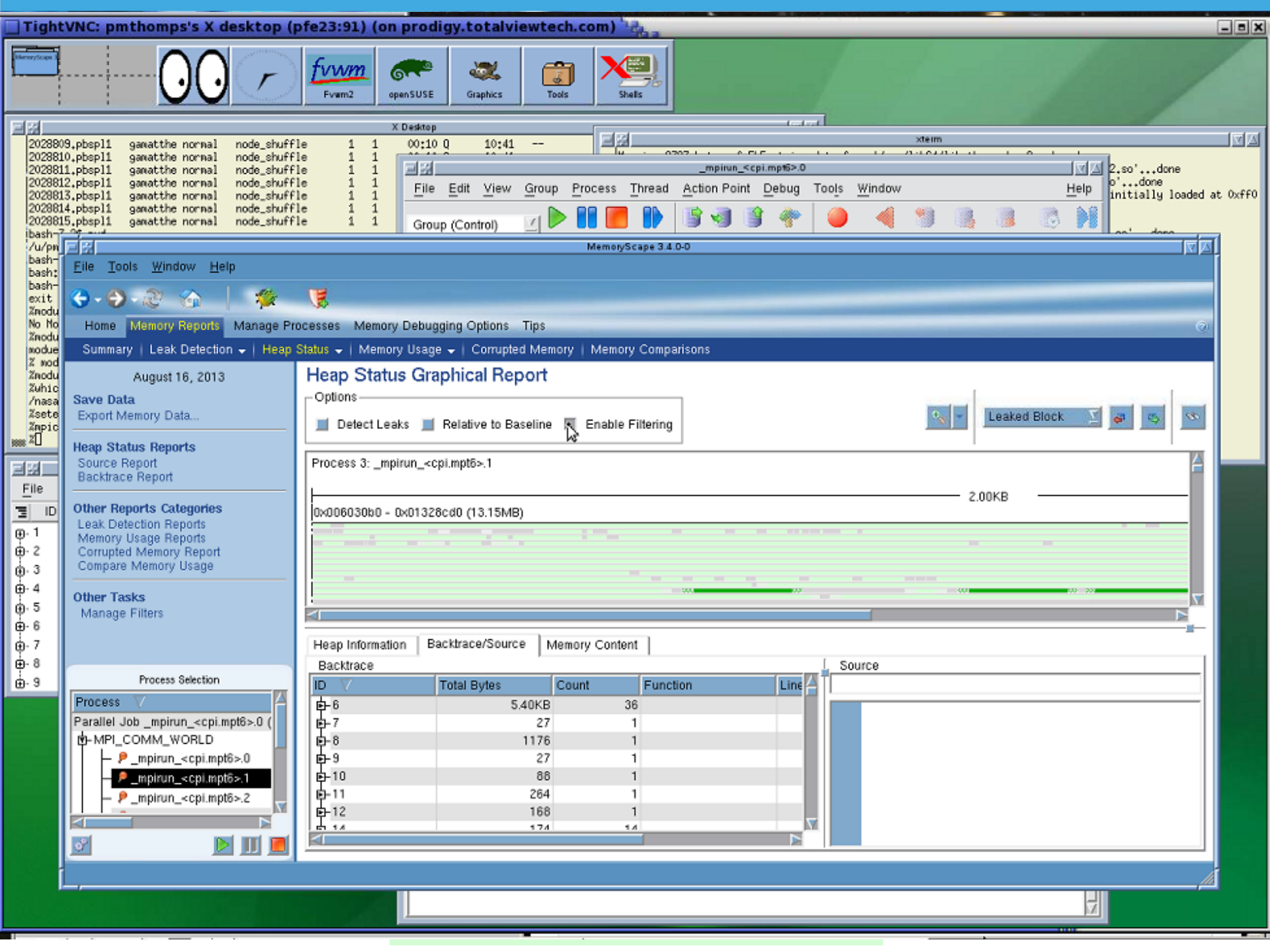
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2028814.pbspl1 gamatthe normal node_shuffle 1 1
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mpirun<cpi.mpt6>.0
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Corrupted Memory Report
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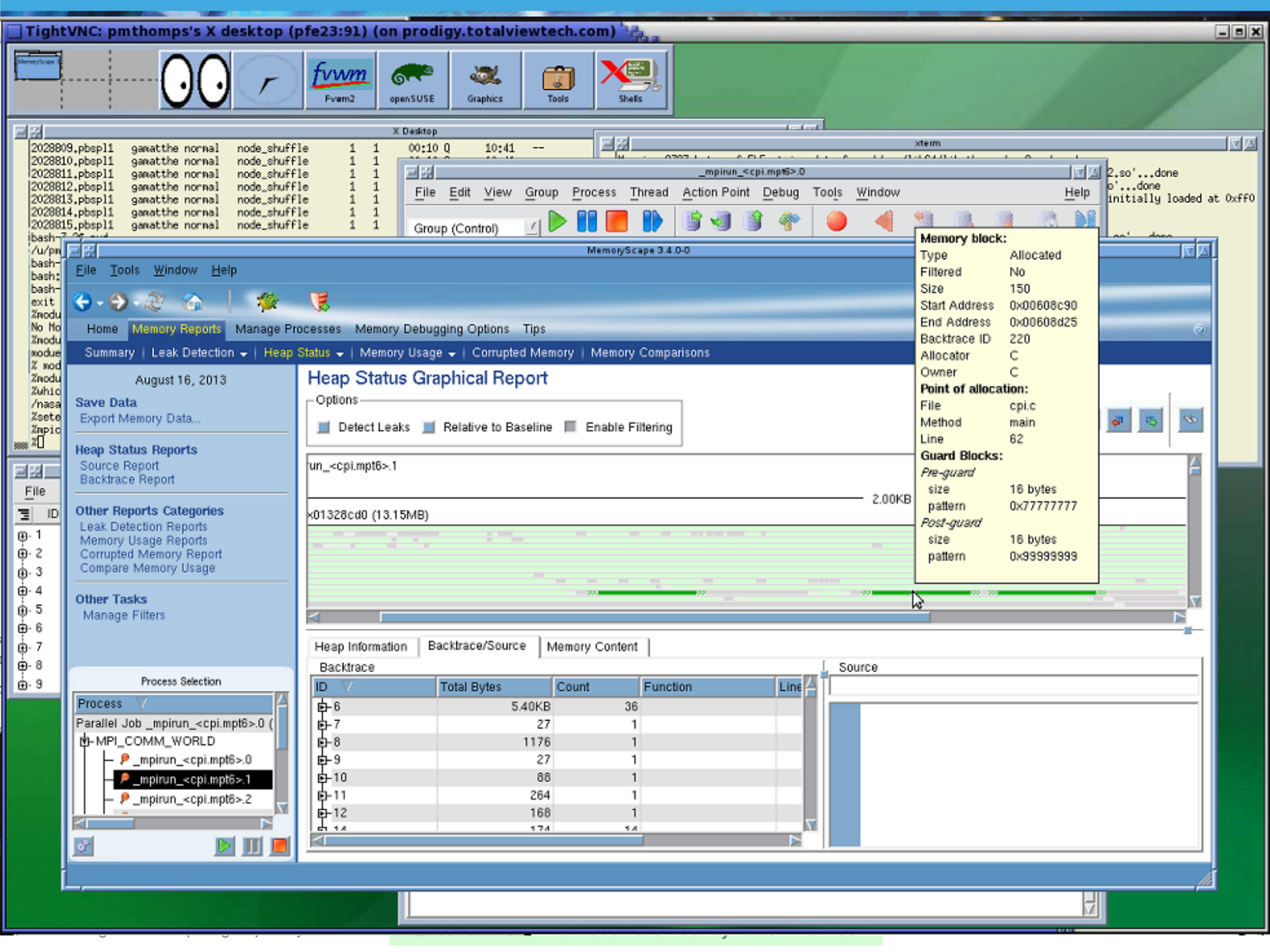
Options
Detect Leaks
Relative to Baseline
Enable Filtering
Leaked Block
Process 3: _mpirun_<cpi.mpt6>.1
2.00KB
0x006030b0 - 0x01328cd0 (13.15MB)
Heap Information
Backtrace/Source
Memory Content
Backtrace
Source
ID Total Bytes Count Function Line
6 5.40KB 36
7 27 1
8 1176 1
9 27 1
10 88 1
11 264 1
12 168 1
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2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2028814.pbspl1 gamatthe normal node_shuffle 1 1
2028815.pbspl1 gamatthe normal node_shuffle 1 1
xterm
mpirun<cpi.mpt6>.0
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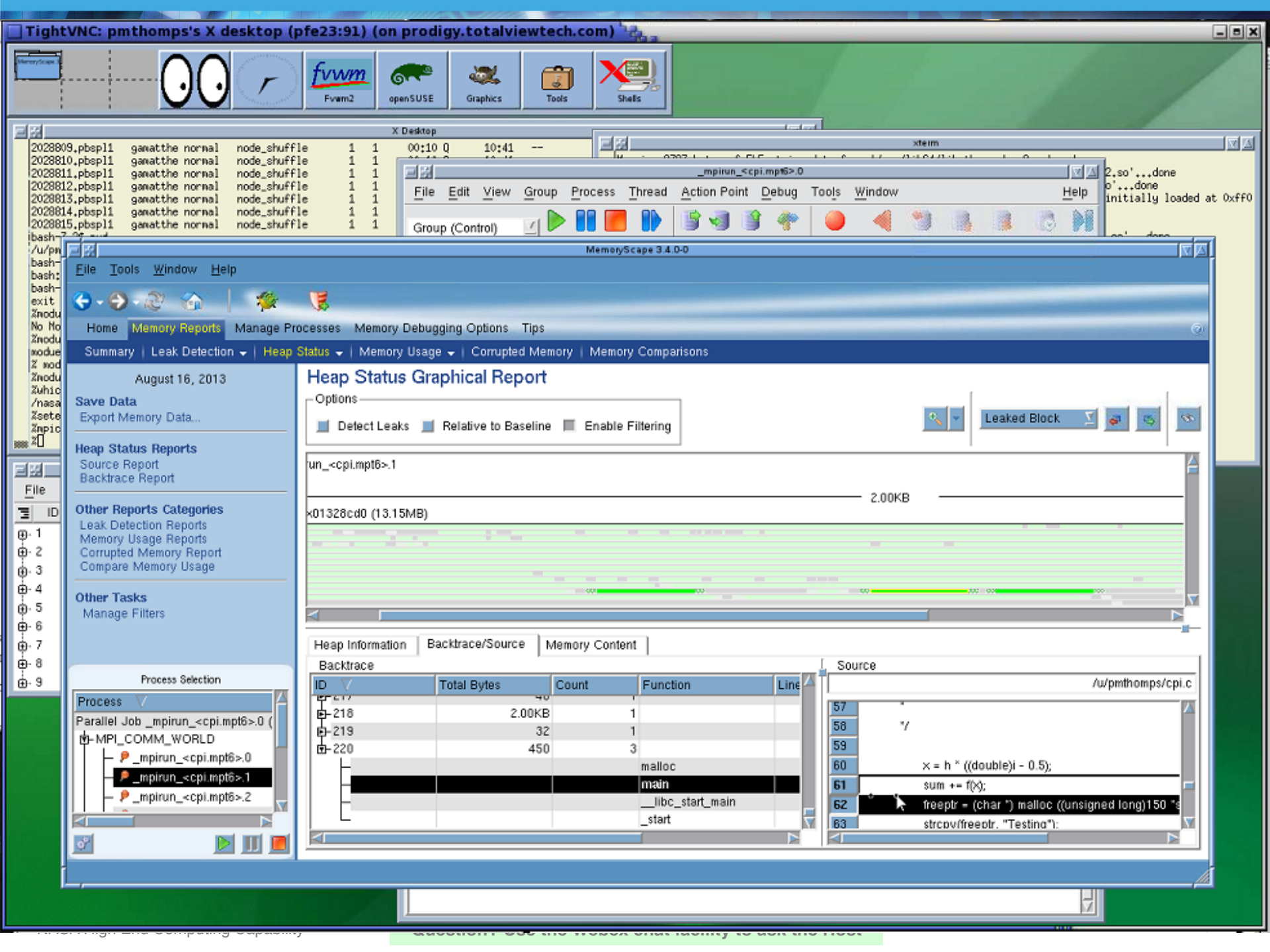
Corrupted Memory Report
Compare Memory Usage
Other Tasks
Manage Filters
Heap Status Graphical Report
Options
Detect Leaks
Relative to Baseline
Enable Filtering
un_<cpi.mpt6>.1
2.00KB
x01328cd0 (13.15MB)
Memory block:
Type Allocated
Filtered No
Size 150
Start Address 0x00608c90
End Address 0x00608d25
Backtrace ID 220
Allocator C
Owner C
Point of allocation:
File cpi.c
Method main
Line 62
Guard Blocks:
Pre-guard
size 16 bytes
pattern 0x77777777
Post-guard
size 16 bytes
pattern 0x99999999
Heap Information
Backtrace/Source
Memory Content
Backtrace
ID Total Bytes Count Function Line
6 5.40KB 36
7 27 1
8 1176 1
9 27 1
10 88 1
11 264 1
12 168 1
Source
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2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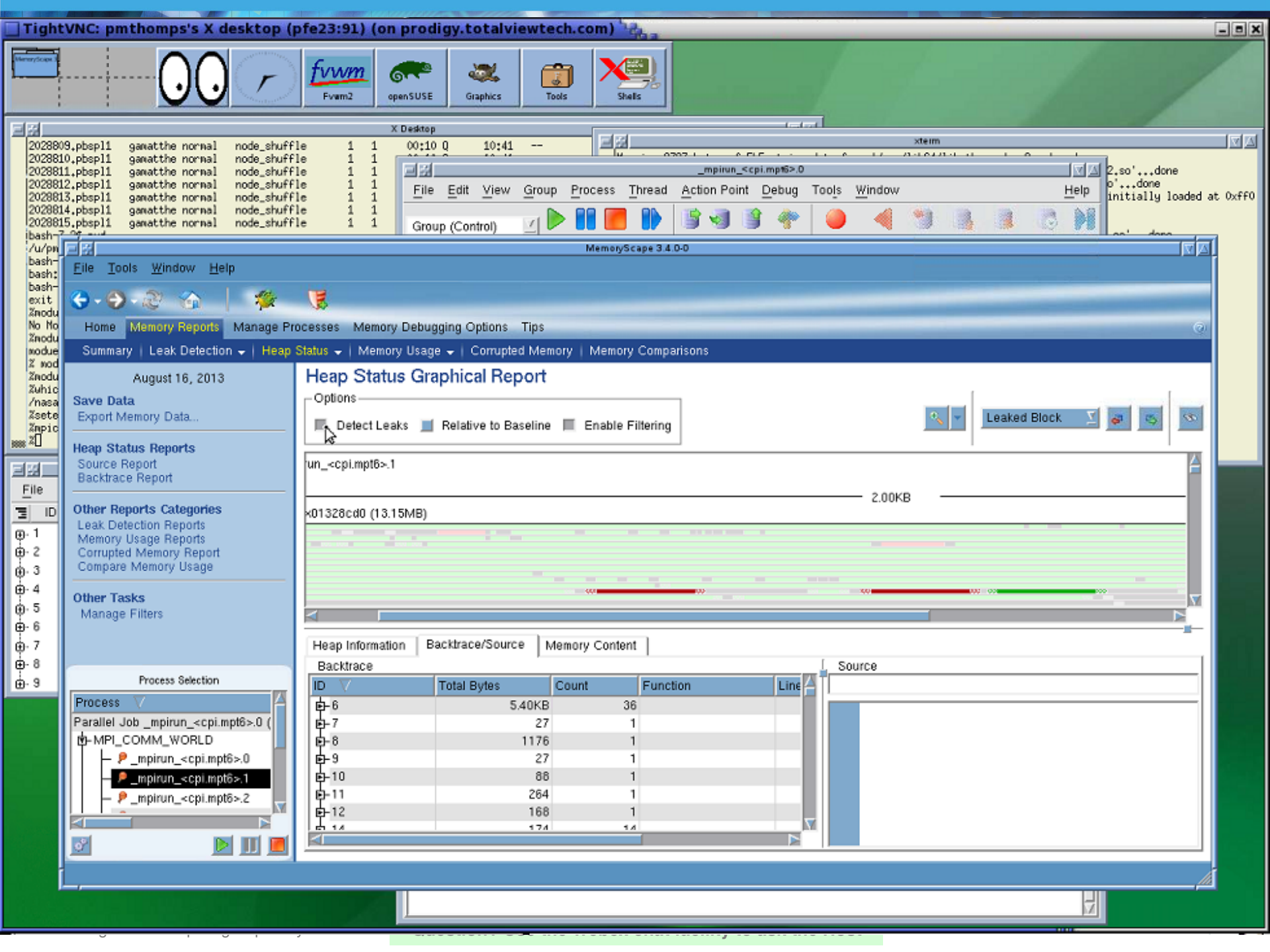
Leaked Block
un_<cpi.mpt6>.1
2.00KB
x01328cd0 (13.15MB)
Heap Information
Backtrace/Source
Memory Content
Backtrace
ID
Total Bytes
Count
Function
Line
218 2.00KB 1
219 32 1
220 450 3
malloc
main
__libc_start_main
_start
Source
/u/pmthomps/cpi.c
57
58 */
59
60 x = h * ((double)i - 0.5);
61 sum += f(x);
62 freeptr = (char *) malloc ((unsigned long)150 *
63 strcpy(freeptr, "Testing");
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2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9 27 1
10 88 1
11 264 1
12 168 1
Source
Process Selection
Process
Parallel Job _mpirun_<cpi.mpt6>.0 (
MPI_COMM_WORLD
mpirun<cpi.mpt6>.0
mpirun<cpi.mpt6>.1
mpirun<cpi.mpt6>.2

More Information

MemoryScape demonstration videos available on the Rogue Wave TotalView Products page

http://www.roguewave.com/products/totalview/resources/videos.aspx

Question? Use the Webex chat facility to ask the Host